The Reliability Data Program

Expanded Version

XILINX®

TABLE OF CONTENTS

Introduction 4

The Reliability Program....................................4

New Process/Design Qualification....................................4
Initial Qualification....................................5
Process Changes....................................5
New Package Qualifications....................................5

Non-Hermetic Packages....................................5, 6
Hermetic Packages....................................6

Reliability Monitor....................................6

Process Monitor....................................7
Assembly Package Monitor....................................7

Reliability Families....................................7

Failure Analysis....................................7

Table I Reliability Tests requirement....................................8, 9
Table II Product Family....................................10

Failure Acceleration Rates....................................11

Table III Failure Analysis Acronyms....................................12

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TABLE OF CONTENTS
Continued

Plastic Encapsulant Data....13

Typical IR-Reflow Profile....14

Product Moisture Classification....15

Latch-Up Data....16 - 17

ESD Data....18 - 19

The FPGA Products....20 - 104

The Coolrunner Products....105 - 113

The CPLD and EPROM Products....114 - 162

Package Qualification & Monitor....164 - 186

Plastic Package Qualification Test Data .... 164 - 176

Ceramic Package Qualification Test Data ....177 - 186

Solderability Test Qualification per EIAJ ....187 - 192

Low Temperature Soldering Test....193 -194

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1. This reliability report is published by Xilinx to provide insight to our customers concerning the reliability of Xilinx products. Reliability is defined as product performance to specification over time in response to varied (specified) environmental stress. The science of reliability engineering is devoted to improving this product performance through measurement, failure analysis, feedback, and corrective action. The ultimate goal of any reliability program is to achieve continuous improvement in the robustness of the product being evaluated.

   As part of this program, finished product reliability is measured periodically to ensure that the product performance meets or exceeds internal and external reliability specifications. Reliability programs are executed in response to internal programs as well as to individual customer requirements. All testing is performed or supervised by experienced Xilinx employees using facilities which are approved and audited by Xilinx for compliance to the requirements of DSCC-VAC and MIL-STD-883 requirements.

2. **The Reliability Program:** The Xilinx reliability qualification of new devices, wafer processes, and packages is designed to ensure that these devices and/or processes satisfy the internal and external customer requirements before transfer into production. The reliability requirements for this transfer are spelled out below.

   2.1 **New Process/Design Qualification:** For new process qualification, the qualifications are to run and pass two wafer lots of high temperature life test. This test accelerates failure mechanisms which are thermally excited by high temperature, such as ionic drift, oxide breakdown, silicon material defects, and assembly related mechanisms. Two lots are run, one to 1,000-hours at 145 degrees C and nominal bias voltage plus 10%. The second lot is run to 168-hours at 145 degrees C and nominal bias voltage plus 10%. The sample size is based on a LTPD = 3.

   In addition to the temperature life test, two wafer lots must be run and pass the Bias Moisture life. This evaluates the effectiveness of chip passivation and device packaging. High humidities in the presence of electrical bias promote electro-chemical corrosion, electro-thermal migration, and other chemical reactions involving the presence of water. The required bias moisture life time at Xilinx is 1,000-hours minimum at 85 degrees C temperature, 85% relative humidity and nominal bias voltage. The sample size is based on a LTPD = 3.

   One wafer lot must be run and pass the Temperature cycle test. This evaluates the resistance of the die, package combination. The required number of cycles is 500 cycles at -65 degrees C/+150 degrees C. The sample size is based on a LTPD = 3

2.2 **Initial Qualification:** For a new die type from a previously qualified process, the requirements are to run one wafer lot of high temperature life test (asa monitor). Lot will be run to 168-hours at 145 degrees C and 5.7 V. or 3.3V. bias; the sample size is based on a LTPD = 3.

2.3 **Process Changes:** For major process changes (major changes are identified as outlined per MIL-PRF-38535 Appendix A and MIL-STD-883) that occur to a qualified device, the above requirements (Refer to Section 2.2) are to be again fulfilled.

2.4 **New Package Qualification:**

2.4.1 Non-Hermetic Packages: The non-hermetic package qualification requires one lot to be run for each of the following tests:

Unbiased Pressure Pot - Pressure pot test is performed to identify the effects of high humidity and heat conditions on the die surface. Steam stressing accelerates moisture penetration through the plastic package material to the surface of the die, resulting in corrosion of metal. The required pressure pot test time is 96-hours at a temperature of 121 degrees C and a pressure of to 2 atmosphere. The sample size is based on a LTPD = 3 .

Temperature Cycling (Liquid to Liquid) - Temperature Cycling applies thermally-induced stress to the devices to accelerate material fatigue and to precipitate failures associated with thermal expansion mismatch and microcracks. The required total cycles are 500 cycles done per method 1011, Condition C (-65 C/ +150 C) of MIL-STD-883 (no bias). The minimum sample size is based on a LTPD = 3. (This test is optional)

Temperature Cycling (Air to Air) - Temperature Cycling applies thermally-induced stress to the devices to accelerate material fatigue and to precipitate failures associated with thermal expansion mismatch and microcracks for a longer period of test. The required total cycles is 500 cycles done per method 1010, Condition C (-65 C/+150 C) of MIL-STD-883. The minimum sample size is based on a LTPD = 3. For BGA, FBGA & CS packages, the required total cycles is 1000 cycles done per method 1010, Condition B (-55 C/+ 125C)

Bias Moisture test (85%R.H./85C) or HAST: 1 lot must be run and pass the Bias Moisture life. The required bias moisture life time at Xilinx is 1,000-hours minimum at 85 degrees C temperature, 85% relative humidity and nominal bias voltage. The sample size is based on LTPD = 3. HAST test is 100 hours minimum @ 130C/85%R.H. The sample size is 22 units.

Resistance to Solvents - This test evaluates the integrity of the package marking. At the present time this test is done outside the company at a qualified test laboratory. Test done per method 2015 of MIL-STD-883. The minimum sample size is 3 units and the allowable maximum reject units is 0.

Solderability - This test is performed to evaluate the integrity of the leads. At the present time this test is done outside the company per a qualified test laboratory. Test done per method 2003 of MIL-STD-883. The minimum sample size is 3 units (25 leads) and the allowable maximum reject units is 0.

Lead Fatigue - This test is performed to evaluate the integrity of the leads. At the present time test is done outside the company at a qualified test laboratory. Test done per method 2004 of MIL-STD-883. The minimum sample size is 3 units (25 leads) and the allowable maximum reject units is 0.

2.4.2 Hermetic Packages: The hermetic package qualification requires a full group D test per MIL-STD-883, Method 5005.

2.5 **Reliability Monitor:** In addition to qualifying all new products and processes before going into production, Xilinx also runs periodic reliability monitors on existing production processes. The details of this monitor program are spelled out in Table I.

2.5.1 Process Monitor: Xilinx fabrication processes are grouped into 16 families according to similarities in process and reliability characteristics and by fabrication facility. One or more products within these fabrication process families are selected as monitor vehicles. Process Monitor is run once a month with rotation of all 16 product families. Lot is tested with static burn-in (Refer to Table I for conditions and time).

2.5.2 Assembly Package Monitor: Package types are grouped into families according to the package characteristics and assembly location. Two major categories, Plastic and Ceramic packages, are identified and each Package Family encompasses one or more lead counts.

Assembly Plastic Package Families are monitored once per quarter using a standard set of reliability tests listed in Table I. Monitor is run on separate packages from the Plastic Package families with rotation of all packages in the families.

3. **Reliability Families:** Xilinx products are manufactured in several worldwide locations. A limited number of process technologies are used for all product lines, resulting in manufacturing efficiency and significant experience with a particular process in different device applications. This strategy accelerates Xilinx's progress on the learning curve and results in process and products which are thoroughly characterized, inherently more reliable, and of the highest quality.

   There are 16 different product families at Xilinx with various package combination: EPROM XC17XXX/L/E, XC17SXX,Flash XC95XXX, XC95XXXXL, CoolRunner (XCRXXXX) and LCA (Logic Cell Array); XC3XXX/A, XC31XX/A, XC4XXX/E, XC4XXXEX, XC4XXXXL, XC4XXXXLA, XCSXX, XC4XXXXV, XCVXXXX, XCVXXXE, XC5XXX. Each product family has one or more products. These products are listed in Table II.

4. **Failure Analysis:** At Xilinx analysis is performed on all Qualification stress test failures, with the appropriate failure mechanism identified. For Failure analysis Xilinx uses the Failure Analysis Lab. in house Failure Analysis Lab. and outside subcontractors that are in constant contact with Design and product Engineering personnel. Each failure analysis is analyzed and categorized in accordance with the failure mechanism.

TABLE I

STRESS	PURPOSE OF TEST	TYPICAL TEST PARAMETERS	SAMPLE FREQUENCY/ STRESS FAMILY
High Temperature Operating Life (HTOL)	Determine major changes in device process, infant mortality levels	145 C Vcc = 5.7V or 3.3V for 256-hours, continuous bias applied. SS = 45 + 2 spares Accept 0	Monthly/Fab Process Family Assembly Package Family
Extended Static Life Test	Determine device process durability to electrical and thermal stresses for long period of time	145 C Vcc = 5.7V or 3.3V for 2,000-hours, continuous basis applied. SS = 45 + 2 spares Accept = 0	Quarterly/Fab Process Family
Temperature Humidity (85/85)	Evaluate moisture resis- t`ance of die in plastic package	85 C @ 85% R.H. Vcc = 5.0V or 3.3V for 1,000-hrs, continuous bias applied. SS = LTPD 3	Quarterly/Fab Process Family Assembly Package Family
Moisture Test	Test moisture resistance and integrity of plastic package	121 C @ 2 Atm. for 96-hours. SS = 45 Accept = 0	Quarterly/Assembly Package Family
Thermal Shock (optional)	Evaluate resistance of the package to cracking and resistance of the bonding wires and leadframe separation	Cond. C, Method 1011 of MIL-STD-883, -65 C to +150 C for 500 Cycles Liquid to Liquid. SS = 45 Accept = 0	Quarterly/Fab Process Family Assembly Package Family
Temperature Cycling	Detect mechanical reli- ability problems and thin film leakage caused by temperature change	Cond. C Method 1010 of MIL-STD-883, -65 C +150 C for 500 Cycles Air to Air. SS = 45 Accept = 0	Quarterly/Fab Process Family Assembly Package Family

TABLE I
Continued

STRESS	PURPOSE OF TEST	TYPICAL TEST PARAMETERS	SAMPLE FREQUENCY/ STRESS FAMILY
Salt Atmosphere (Hermetics only)	Evaluate resistance to corrosion of the package finish and marking	Cond. A, Method MIL-STD-883, Method 1009, 24-hours. SS = 15 Accept = 0	Quarterly/Fab Process Family Assembly Package Family
Solderability	Evaluate the solderability of the leads under condi- tions of low soldering temperature following exposure to the aging effects of water vapor	MIL-STD-883, Method 2003. SS = 3 (25 Leads) Accept = 0	Quarterly/Fab Process Family Assembly Package Family
Mark Permanency	Evaluate the integrity of the package marking during exposure to a variety of solvents	MIL-STD-883, Method 2015. SS = 3 Accept = 0	Quarterly/Fab Process Family Assembly Package Family
Lead Fatigue	Evaluate the resistance of the completed assembly to vibrations during storage, shipping, and operations	MIL-STD-883, Method 2004. SS = 3 (25 Leads) Accept = 0	Quarterly/Fab Process Family Assembly Package Family
Physical Dimension	Verify that the external physical dimensions of the device are in accordance with the applicable procurement document	MIL-STD-883, Method 2015. SS = 15	Quarterly/Fab Process Family Assembly Package Family

TABLE II

EPROM XC17XXD XC17XX/L/E	EPROM XC17SXX	LCA XC3XXX/A	LCA XC31XX/A	LCA XC4XXX/E	LCA XC4XXX/EX	LCA XC4XXXXL	LCA XC4XXXXLA
XC1718D	XC17S05/XL	XC3020/A	XC3120/A	XC4003/E	XC4028EX	XC4005XL	XC4013XLA
XC1736D	XC17S10/XL	XC3030/A	XC3130/A	XC4005/E	XC4036EX	XC4010XL	XC4020XLA
XC1765D	XC17S20/XL	XC3042/A	XC3142/A	XC4006/E		XC4013XL	XC4044XLA
XC17128D	XC17S30/XL	XC3064/A	XC3164/A	XC4008/E		XC4020XL	XC4028XLA
XC17256D	XC17S40/XL	XC3090/A	XC3190/A	XC4010/E		XC4028XL	XC4036XLA
XC1701			XC3195/A	XC4013/E		XC4036XL	XC4062XLA
XC1702				XC4020/E		XC4044XL	XC4085XLA
XC1704				XC4025/E		XC4052XL	
XC1765E						XC4062XL	
XC17256E						XC4085XL	

LCA XC4XXXXV	LCA XCSXX/XL	LCA XC5XXX	LCA XCVXXXX	LCA XCVXXXXE	CoolRunner XCRXXXX	FLASH XC95XXX/XL
XC40110XV	XCS05/XL	XC5202	XCV50	XCV100E	XCR3960	XC9536/XL
XC40200XV	XCS10/XL	XC5204	XCV100	XCV200E	XCR5064	XC9572/XL
XC40150XV	XCS20/XL	XC5206	XCV150	XCV300E	XCR3(5)032	XC95108/XL
XC40250XV	XCS30/XL	XC5210	XCV200	XCV400E	XCR3(5)064	XC95216/XL
	XCS40/XL	XC5215	XCV300	XCV600E	XCR3(5)128	XC95288/XL
			XCV400	XCV800E	XCR22(L)V10	
			XCV600	XCV1000E		
			XCV800	XCV1600E		
			XCV1000	XCV2000E		
				XCV3200E		

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5. **Failure Acceleration Rates:** Since Xilinx uses accelerated stress tests in determining product failure rates, it is important to understand how the accelerated conditions are translated to standard operating conditions. Xilinx uses temperature acceleration techniques in which the thermal activation energy (Ea) is assigned for all failures mechanisms. FIT rates can be calculated from these data using the procedure for FIT rate calculation outlined below. The result will be the upper control limit expressed in Fits for the desired degree of confidence.

$$\text{Upper control limit expressed in Fits} = \frac{\chi^2 \; 10^9}{2(\text{No. of dev.})(\text{No. of hrs.})\ (\text{acc. Factor})}$$

Where χ^2 = tabular value of chi-squared distributions at the confidence level desired at (2f + 2) degress of freedom, where f is the number of failures.

The acceleration factor is calculated using the Arrhenius relationship

$$A = \exp \{ Ea/k\ (1/Tj2 - 1/Tj1) \}$$

Ea = Thermal activation energy (electron Volts)
A = Acceleration factor (0.9 Ev expressed in electron volts)
K = Boltzman's constant {8.617164 x 10 exp (-5 ev/deg K)}
Tj1 = In-use junction temperature in degrees Kelvin (Tin °K = T in °C + 273.16)
Tj2 = In stress junction temperature in degrees Kelvin (Tin °K = T in °C + 273.16)

The in-use failure rate is the computed by dividing the in-stress failure rate by the acceleration factor

$$fr1 = fr2/A$$

fr1 = Failure rate at specified in-use junction temperature Tj1
fr2 = Failure rate at specified in-stress junction temperature Tj2
A = Acceleration factor

Notes: FIT = Failure Unit
1 FIT = 1 Failure / Billion device hours (1 x 10E09 failures)
1 FIT = 1 Failure / 10E+09 Device hours

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TABLE III

F/A ACRONYM	DESCRIPTION	F/A ACRONYM	DESCRIPTION
ASL	Lifted Ball Bond	CMGL	Fine Leak at seal glass between Ceramic material glass.
FANC	Failure Analysis not completed	INC	Inconclusive
MST	Moisture in package	RAND	Random defect
MARG	Marginal parametric failure	VCMD	Via contact to metal defect
NDF	No Defect found	VUO	Via opened
PFSM	Particle found in 2 Metal causing short		

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Plastic Encapsulant Data (Typical)

	Test Conditions	6300HS	7320C	7304	MP8000CH4
Volume Resistivity (Ohm.cm)	150C	1×10^{13}	1×10^{13}	1×10^{13}	5.5×10^{13}
Water Absorption)	Boil 48 hrs (wt%)	0.3/24 hrs	0.22/24 hrs	0.25/24 hrs	0.3/48 hrs
Spiral Flow	(cm)	80	180	125	90cm
Ionic Impurities 160C x 23 hrs Extraction	Na+ (ppm)	<1	<1	<1	2
	Cl - (ppm)	5	5	5	18
Flexural Strength $(kgf/mm)^2$	25C	12	17	17	17
Flexural Modulus $(kgf/mm)^2$	25C	1200	1750	1800	1900
Thermal Expansion (Cured @ 175C for 5 hrs)	α 1(1/C)	1.7×10^{-5}	1.3×10^{-5}	1.4×10^{-5}	1.2×10^{-5}
	α 2(1/C)	6.8×10^{-5}	5.2×10^{-5}	5.8×10^{-5}	4.9×10^{-5}
Glass Transition -	Tg Range (C)	155 ~ 170C	130 ~ 155C	153 ~ 165C	156C ~ 160C

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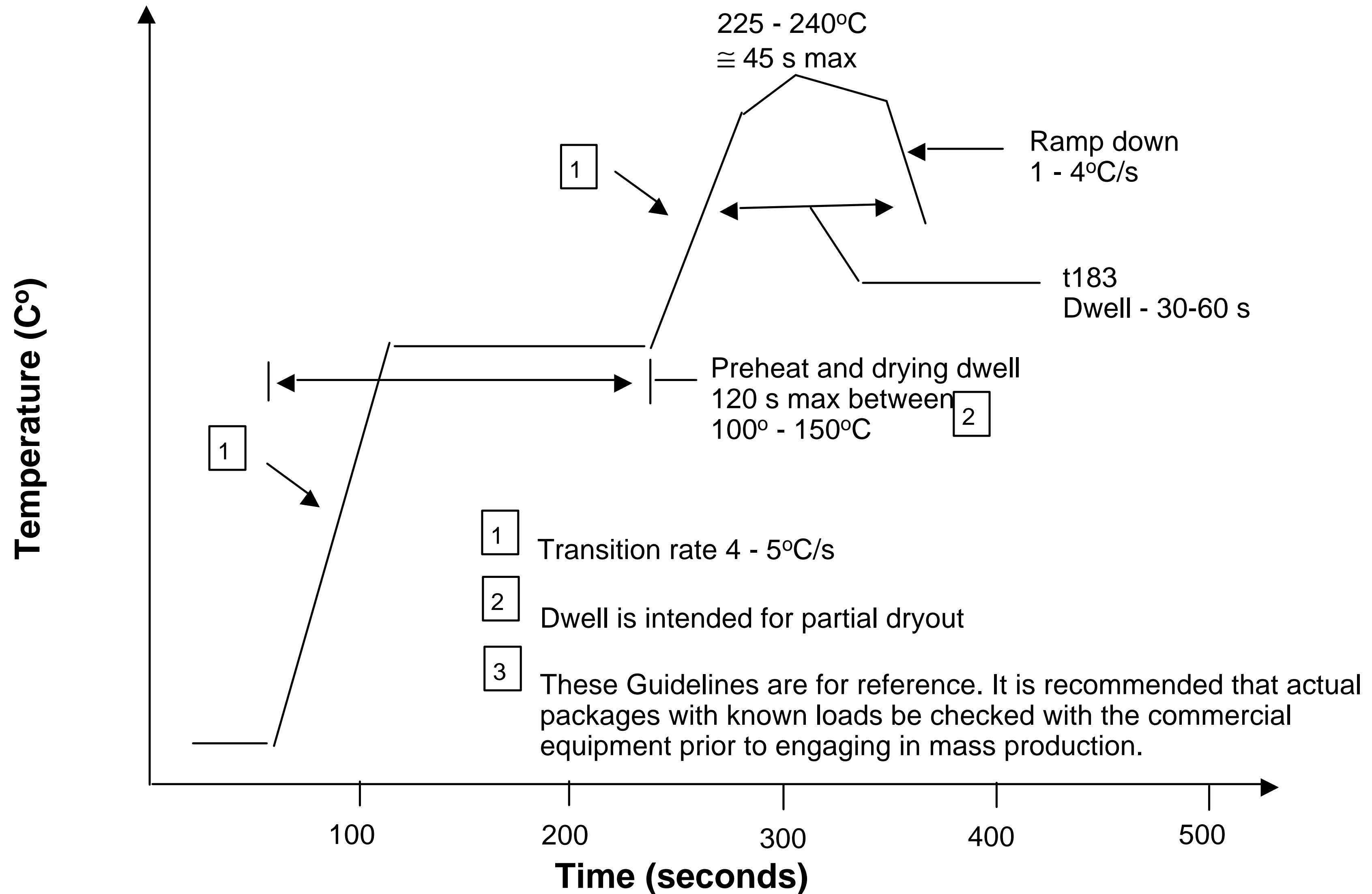
XILINX Typical I.R. Convection Oven Reflow



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Product Moisture Classification

PD-8	XC1700D/E & XC17SXX	Level 1 / Unlimited
SO-8, SO-20	XC1700D/E & XC17SXX	Level 1 / Unlimited
VO-8	XC1700D/E & XC17SXX	Level 1 / Unlimited
PLCC (20, 44) PLCC (68)	ALL	Level 1 / Unlimited 90% Level 1 / Unlimited 10% Level 3
PLCC 84	ALL	30% Level 1 / Unlimited 70% Level 3 / 168 hours
PQFP (100, 160, 208, 240)	ALL	Level 3 / 168 hours
TQFP (44, 100, 144, 176)	ALL	Level 3 / 168 hours
HQFP (160, 208, 240, 304)	ALL	Level 3 / 168 hours
VQFP (44, 64, 100)	ALL	Level 3 / 168 hours
HTQFP (144, 176, 208)	ALL	Level 3 / 168 hours
PPGA (132, 175)	ALL	Level 1 / Unlimited
CS (48, 144, 280)	ALL	Level 3 / 168 hours
MQFP (208, 240)	ALL	Level 1 / Unlimited
BGA (225, 256)	ALL	Level 3 / 168 hours
SBGA (352, 432, 560)	ALL	Level 3 / 168 hours
SBGA (560)	XC4085XL	Level 3 / 168 hours
FBGA (256, 456, 556, 676, 680)	XCVXXXX	Level 3 / 168 hours

Note (1): Classification for Plastic Integrated Circuit Surface Mount Devices, per J-STD-020

Latch-Up Data
Per EIA/JEDEC-78

Device	Worst Latch-Up			Latch-Up Test Condition
XC17XXD/L	300mA Vcc +4.1V <-300mA Gnd -1.7V		>560mA Vcc +3.9V <-560mA Gnd -2.5V	25°C
XC17XXE XCS17XX	>300mA Vcc +4.1V <-300mA Gnd -1.7V	to	>600mA Vcc +9.0V <-600mA Gnd -2.5V	25°C
XC3XXX/A	220mA Vcc +1.8V <-300mA Gnd -1.8V	to	300mA Vcc +2.4V <-300mA Gnd -1.4V	25°C
XC31XX/A	300mA Vcc +1.5V <-300mA Gnd -1.3V			25°C
XC4XXX/A	300mA Vcc +2.6V <-300mA Gnd -1.4V			25°C
XC4XXXE	250mA Vcc +1.5V <-250mA Gnd -1.7V	to	300mA Vcc +2.5V <-300mA Gnd -1.5V	25°C
XC4XXXXL	Vcc +3.4V** <-250mA Gnd -1.4V		Vcc +3.4V** <-550mA Gnd -1.55V	25°C
XC4XXXEX	250mA Vcc +1.8V <-250mA Gnd -1.6V	to	400mA Vcc + 7.0V <-400mA Gnd -1.33	25°C

** The 5V tolerant I/O's used in the XL device are guaranteed not to sustain permanent damage when input is forced to maximum of 7V and with the forcing power supply being current limited to 200 mA.

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Latch-Up Data
Per EIA/JEDEC-78

Device	Worst Latch-Up			Latch-Up Test Condition
XC4XXXXLA	300mA Vcc +5.6V <-300mA Gnd -1.5V		460mA Vcc +7.0V <-460mA Gnd -2.0V	25°C
XC4XXXXV	200mA Vcc +5.6V <-210mA Gnd -1.3V			25°C
XCVXXXX	N/A <-210mA Gnd -1.2V		250mA Vcc +5.6V <-250mA Gnd -1.2V	25°C
XCVXXXXE	210mA Vcc +5.3V <-210mA Gnd -1.10V			25°C
XCSXX	>410mA Vcc +8.1V <410mA Gnd -2.0V			25°C
XCSXXXL	310mA Vcc +6.1V <-310mA Gnd -1.5V	to	410mA Vcc +6.5V <-410mA Gnd -1.9V	25°C
XC5XXX	250mA Vcc +2.40V <-250mA Gnd -1.40V	to	350mA Vcc +2.35V <-400mA Gnd -2.20V	25°C
XC95XXX	250mA Vcc +1.3V <-250mA Gnd -2.0V	to	600mA Vcc +7.2V <-600mA Gnd -1.70V	25°C
XC95XXXL	350mA Vcc +2.8V <-525mA Gnd -0.53V			25°C

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ESD Data

Device	Human Body Model Worst Case ESD Mil-Std-883D Method 3015	Machine Model Worst Case ESD EIAJ Method 20	Charge Device Model Worst Case ESD
XC17XXXD	±6000V	+500V to +900V	±2000V (1)
XC17XXXE XCS17XXX	±3000V to ±6000V	+325V	±1000V (1)
XC31XX/A	±1750V to ±8000V	+800V to +700V	±1000V (3)
XC3XXX/A	±4000V to ±7000V	+325V to +600V	±2000V (2)
XC4XXX/A	±1000V to ±8000V	+800V to +900V	±2000V (4)
XC4XXXE	±3000V to ±8000V		±2000V (5)
XC4XXXEX	±3000V to ±7000V		±2000V (6)
XC4XXXXL	±2000V to ±8000V		±1000V (7)
XC4XXXXLA	±2000V to ±7000V		±500V(Core)/ ±1000V(corner)(11)

(1) Measured on XC1765D, (2) Measured on XC3090, (3) Measured on XC3190/A, (4) Measured on XC4005

(5) Measured on XC4005E, (6) Measured on XC4010E, (7) Measured on XC4028XL (±1000V, Equipment limitation), (12) Measured on XC17256E

ESD Data

Device	Human Body Model Worst Case ESD Mil-Std-883D Method 3015	Machine Model Worst Case ESD EIAJ Method 20	Charge Device Model Worst Case ESD
XCXXXXXV	±1500V to ±2000V		
XCVXXXX	±1400V to ±1900V		
XCVXXXXE	±2000V		
XCSXX	±6000V		±1000V (10)
XCSXXXL	±3000V		
XC5XXX	±3000V to ±7000V		±2000V (8)
XC95XXX	±2000V to ±8000V		±2000V (9)
XC95XXXL	±2000V to ±6000V		±1000V (12)
XCRXXXX	±2000V to ±4000V		

(8) Measured on XC5210, (9) Measured on XC95108, (10) Measured on XCS10 & XCS30, (11) Measured on XC4062XLA, Measured on XC9536XL

The FPGA Products

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Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC3XXX/A, XC31XX/A, XC4XXX, XC4XXXE**
Package Type:	**Various**
Actual Temperature	**145C +8C/-0C**
Actual Voltage:	**5.7V +/-0.25**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

	XC3XXX/A	XC31XX/A	XC4XXX	XC4XXXE
Period:	**Jan. 1, 1998 to Jan. 1, 2000**			
Combined Lots:	**8**	**3**	**2**	**15**
Failures:	**0**	**0**	**0**	**0**
Device on test:	**364**	**137**	**92**	**672**
Actual device hours:	**302,479**	**80,612**	**60,812**	**538,254**
Mean :	**831**	**588**	**661**	**801**
Equivalent device hours @ Tj=125C:	**802,584**	**213,892**	**161,356**	**1,428,179**
Equivalent device hours @ Tj=55C:	**62,312,359**	**16,606,521**	**12,527,611**	**110,883,322**
Equivalent device hours @ Tj=25C:	**7.52E+08**	**2.00E+08**	**1.51E+08**	**1.34E+09**
Failure Rate(60% C.L.) in FITS @ Tj=55C:	**15**	**55**	**73**	**8**
Failure Rate(60% C.L.) in FITS @ Tj=25C:	**1**	**5**	**6**	**0.68**

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXEX, XC4XXXXL, XCSXX,
Package Type: Various
Actual Temperature: 145C +8C/-0C
Actual Voltage: 3.6V +/-0.3**, 5.7V +/-0.25
Assumed Activation Energy: 0.70 ev @ C.L. = 60%

	XC4XXXEX	XC4XXXXL **	XC4XXXXL Dynamic**	XCSXX
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Lots:	2	20	1	8
Failures:	0	2	0	0
Device on test:	126	746	43	332
Actual device hours:	67,452	1,089,576	152,908	317,791
Mean :	535	1,461	3,556	957
Equivalent device hours @ Tj=125C:	178,974	2,891,032	405,719	843,212
Equivalent device hours @ Tj=55C:	113,895,488	224,458,725	10,675,223	65.466,716
Equivalent device hours @ Tj=25C:	1.68E+08	2.71E+09	3.80E+08	7.90E+08
Failure Rate(60% C.L.) in FITS @ Tj=55C:	66	14	29	31
Failure Rate(60% C.L.) in FITS @ Tj=25C:	5	1	2	3

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCSXXXL, XC4XXXXV, XC4XXXXLA, XCVXXX
Package Type: Various
Actual Temperature: 145C +8C/-0C
Actual Voltage: 2.7V +/-0.3(Core);3.6V+/-0.3(I/O)*,3.6V+/-0.3**, 5.7V +/-0.25
Assumed Activation Energy: 0.70 ev @ C.L. = 60%

Period: Jan. 1, 1998 to Jan. 1, 2000

	XCSXXXL **	XC4XXXXV *	XC4XXXXLA **	XCVXXX *
Combined Lots:	2	5	8	15
Failures:	2	0	1	4
Device on test:	136	147	389	727
Actual device hours:	137,900	156,790	304,360	754,383
Mean :	1,014	1,067	782	1,038
Equivalent device hours @ Tj=125C:	365,898	416,019	807,575	2,001,646
Equivalent device hours @ Tj=55C:	28,408,168	32,299,613	62,699,855	155,407,100
Equivalent device hours @ Tj=25C:	3.43E+08	3.90E+08	7.57E+08	1.88E+09
Failure Rate(60% C.L.) in FITS @ Tj=55C:	109	28	32	34
Failure Rate(60% C.L.) in FITS @ Tj=25C:	9	2	3	3

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC5XXX, XCVXXXE
Package Type: Various
Actual Temperature: 145C +8C/-0C
Actual Voltage: 2.7V +/-0.3(Core);3.6V+/-0.3(I/O)*,3.6V+/-0.3**, 5.7V +/-0.25
Assumed Activation Energy: 0.70 ev @ C.L. = 60%

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC5XXX	XCVXXXE
Combined Lots:	10	2
Failures:	0	1
Device on test:	587	97
Actual device hours:	916,221	97,381
Mean :	1,561	1,004
Equivalent device hours @ Tj=125C:	2,431,059	258,386
Equivalent device hours @ Tj=55C:	188,746,629	20,061,028
Equivalent device hours @ Tj=25C:	2.28E+09	2.42E+08
Failure Rate(60% C.L.) in FITS @ Tj=55C:	5	100
Failure Rate(60% C.L.) in FITS @ Tj=25C:	0.4	8

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC3XXX/A Microcircuit Group**
Package Type:	**PLCC- 84, PGA- 84**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**5.7V +/-0.25**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

	XC3020/A	XC3030/A	XC3042/A
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Lots:	1	1	3
Failures:	0	0	0
Device on test:	47	45	137
Actual device hours:	12,032	47,115	102,662
Mean :	256	1,047	749
Equivalent device hours @ Tj=125C:	31,925	125,013	272,399
Equivalent device hours @ Tj=55C:	2,478,659	9,705,952	21,148,944
Equivalent device hours @ Tj=25C:	2.99E+07	1.17E+08	2.55E+08

Failure Analysis:

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XC3XXX/A Microcircuit Group
Package Type:	PLCC- 84, PGA- 84
Actual Temperature:	145C +8C/-0C
Actual Voltage:	5.7V +/-0.25
Assumed Activation Energy:	0.70 ev @ C.L. = 60%

	XC3064/A	XC3090/A	XC3XXX/A
Period:		Jan. 1, 1998 to Jan. 1, 2000	
Combined Lots:	1	2	8
Failures:	0	0	0
Device on test:	45	90	364
Actual device hours:	46,035	94,635	302,479
Mean :	1,023	1,052	831
Equivalent device hours @ Tj=125C:	122,147	251,100	802,584
Equivalent device hours @ Tj=55C:	9,483,466	19,495,337	62,312,359
Equivalent device hours @ Tj=25C:	1.14E+08	2.35E+08	7.52E+08
Failure Analysis:			

Failure Rate (60% C.L.) in FITS @ Tj=55C:	15
Failure Rate (60% C.L.) in FITS @ Tj=25C:	1

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC31XX/A Microcircuit Group
Package Type: PLCC- 84, PGA-175, PQFP-160
Actual Temperature: 145C +8C/-0C
Actual Voltage: 5.7V +/-0.25
Assumed Activation Energy: 0.70 ev @ C.L. = 60%

	XC3190/A	XC3195/A	XC31XX/A
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Lots:	2	1	3
Failures:	0	0	0
Device on test:	92	45	137
Actual device hours:	58,517	22,095	80,612
Mean :	636	491	588
Equivalent device hours @ Tj=125C:	155,266	58,626	213,892
Equivalent device hours @ Tj=55C:	12,054,828	4,551,693	16,606,521
Equivalent device hours @ Tj=25C:	1.46E+08	5.49E+07	2.00E+08
Failure Analysis:			
Failure Rate (60% C.L.) in FITS @ Tj=55C:			55
Failure Rate (60% C.L.) in FITS @ Tj=25C:			5

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC4XXX Microcircuit Group**
Package Type:	**PLCC-84, PGA-191**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**5.7V +/-0.25**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

	XC4005	XC4XXX
Period:	**Jan. 1, 1998 to Jan. 1, 2000**	
Combined Lots:	**2**	**2**
Failures:	**0**	**0**
Device on test:	**92**	**92**
Actual device hours:	**60,812**	**60,812**
Mean :	**661**	**661**
Equivalent device hours @ Tj=125C:	**161,356**	**161,356**
Equivalent device hours @ Tj=55C:	**12,527,611**	**12,527,611**
Equivalent device hours @ Tj=25C:	**1.51E+08**	**1.51E+08**

Failure Analysis:

Failure Rate (60% C.L.) in FITS @ Tj=55C:	**73**
Failure Rate (60% C.L.) in FITS @ Tj=25C:	**6**

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXE Microcircuit Group
Package Type: PLCC-84, PGA-156, PQFP-208,240, HQFP-240, CB164
Actual Temperature: 145C +8C/-0C
Actual Voltage: 5.7V +/-0.25
Assumed Activation Energy: 0.70 ev @ C.L. = 60%

	XC4003E	XC4005E	XC4008E
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Lots:	2	6	1
Failures:	0	0	0
Device on test:	90	274	45
Actual device hours:	91.260	173,599	45,405
Mean :	1,014	634	1,009
Equivalent device hours @ Tj=125C:	242,145	460,620	120,476
Equivalent device hours @ Tj=55C:	18,800,068	35,762,361	9,353,683
Equivalent device hours @ Tj=25C:	2.27E+08	4.32E+08	1.13E+08

Failure Analysis:

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXE Microcircuit Group
Package Type: PLCC-84, PGA-156, PQFP-208,240, HQFP-240, CB164
Actual Temperature: 145C +8C/-0C
Actual Voltage: 5.7V +/-0.25
Assumed Activation Energy: 0.70 ev @ C.L. = 60%

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC4010E	XC4013E	XC4025E	XC4XXXE
Combined Lots:	1	4	1	15
Failures:	0	0	0	0
Device on test:	45	176	42	672
Actual device hours:	43,830	133,340	50,820	538,254
Mean :	974	758	1,210	801
Equivalent device hours @ Tj=125C:	116,297	353,798	134,843	1,428,179
Equivalent device hours @ Tj=55C:	9,029,224	27,468,783	10,469,203	110,883,322
Equivalent device hours @ Tj=25C:	1.09E+08	3.32E+08	1.26E+08	1.34E+09

Failure Analysis:

Failure Rate (60% C.L.) in FITS @ Tj=55C:	8
Failure Rate (60% C.L.) in FITS @ Tj=25C:	0.68

Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XC4XXXEX Microcircuit Group
Package Type:	HQFP-240
Actual Temperature:	145C +8C/-0C
Actual Voltage:	5.7V +/-0.25
Assumed Activation Energy:	0.70 ev @ C.L. = 60%

	XC4028EX	XC4XXXEX
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Lots:	2	2
Failures:	0	0
Device on test:	126	126
Actual device hours:	67,452	67,452
Mean :	535	535
Equivalent device hours @ Tj=125C:	178,974	178,974
Equivalent device hours @ Tj=55C:	13,895,488	113,895,488
Equivalent device hours @ Tj=25C:	1.68E+08	1.68E+08
Failure Analysis:		
Failure Rate (60% C.L.) in FITS @ Tj=55C:		66
Failure Rate (60% C.L.) in FITS @ Tj=25C:		5

Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC4XXXXL Microcircuit Group**
Package Type :	**PLCC-84, PGA- 299, 411, 475 , 559, CB-228, HQFP-208, 240 PQFP-208**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**3.6V +/-0.3**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC4002XL	XC4005XL	XC4013XL
Combined Lots:	1	3	1
Failures:	0	0	0
Device on test:	76	133	42
Actual device hours:	230,052	247,195	45,150
Mean :	3,027	1,859	1,075
Equivalent device hours @ Tj=125C:	610,410	655,896	119,799
Equivalent device hours @ Tj=55C:	47,391,993	50,923,547	9,301,151
Equivalent device hours @ Tj=25C:	5.72E+08	6.15E+08	1.12E+08

Failure Analysis:

Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXL Microcircuit Group
Package Type: PLCC-84, PGA- 299, 411, 475 , 559, CB-228, HQFP-208, 240 PQFP-208
Actual Temperature: 145C +8C/-0C
Actual Voltage: 3.6V +/-0.3
Assumed Activation Energy: 0.70 ev @ C.L. = 60%

	XC4028XL	XC4036XL	XC4044XL
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Lots:	1	4	2
Failures:	1	1	0
Device on test:	45	204	51
Actual device hours:	45,000	151,345	75,390
Mean :	1,000	742	1,478
Equivalent device hours @ Tj=125C:	119,401	401,572	200,036
Equivalent device hours @ Tj=55C:	9,270,251	31,177,913	15,530,760
Equivalent device hours @ Tj=25C:	1.12E+08	3.76E+08	1.87E+08
Failure Analysis:	F/A98125(1)-INC	F/A98007(1)-VUO	

Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC4XXXXL Microcircuit Group**
Package Type:	**PLCC-84, PGA- 299, 411, 475 , 559, CB-228, HQFP-208, 240 PQFP-208**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**3.6V +/-0.3**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC4052XL	XC4062XL	XC4085XL	XC4XXXXL
Combined Lots:	1	5	1	20
Failures:	0	0	0	2
Device on test:	22	157	16	746
Actual device hours:	44,352	203,012	48,080	1,089,576
Mean :	2,016	1,293	3,005	1,461
Equivalent device hours @ Tj=125C:	117,682	538,663	127,573	2,891,032
Equivalent device hours @ Tj=55C:	9,136,759	41,821,603	9,904,748	224,458,725
Equivalent device hours @ Tj=25C:	1.10E+08	5.05E+08	1.20E+08	2.71E+09

Failure Analysis:

Failure Rate (60% C.L.) in FITS @ Tj=55C:	14
Failure Rate (60% C.L.) in FITS @ Tj=25C:	1

Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC4XXXXL Microcircuit Group**
Package Type:	**PLCC-84, PGA- 223, PQFP-240**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**3.6V +/-0.3**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

Period: Jan. 1, 1998 to Jan. 1, 2000

	XCS10	XCS30	XCS40	XCSXX
Combined Lots:	1	5	2	8
Failures:	0	1	0	1
Device on test:	45	202	85	332
Actual device hours:	49,860	212,361	55,570	317,791
Mean :	1,108	1,051	654	957
Equivalent device hours @ Tj=125C:	132,296	563,469	147,447	843,212
Equivalent device hours @ Tj=55C:	10,271,438	43,747,549	11,447,730	65.466,716
Equivalent device hours @ Tj=25C:	1.24E+08	5.28E+08	1.38E+08	7.90E+08
Failure Analysis:		F/A99119(1)-INC		

Failure Rate (60% C.L.) in FITS @ Tj=55C:	31
Failure Rate (60% C.L.) in FITS @ Tj=25C:	3

Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCSXXXL Microcircuit Group
Package Type: PGA- 191, 223
Actual Temperature: 145C +8C/-0C
Actual Voltage: 3.6V +/-0.3
Assumed Activation Energy: 0.70 ev @ C.L. = 60%

	XCS20XL	XCS30XL	XCSXXXL
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Lots:	2	1	2
Failures:	2	0	2
Device on test:	64	72	136
Actual device hours:	65,900	72,000	137,900
Mean :	1,030	1,000	1,014
Equivalent device hours @ Tj=125C:	174,856	191,042	365,898
Equivalent device hours @ Tj=55C:	13,575,767	14,832,401	28,408,168
Equivalent device hours @ Tj=25C:	1.64E+08	1.79E+08	3.43E+08
Failure Analysis:	F/A98193(2)-RAND		

Failure Rate (60% C.L.) in FITS @ Tj=55C:	109
Failure Rate (60% C.L.) in FITS @ Tj=25C:	9

Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XC4XXXXL Microcircuit Group
Package Type:	PLCC-84
Actual Temperature:	145C +8C/-0C
Actual Voltage:	3.6V +/-0.3
Assumed Activation Energy:	0.70 ev @ C.L. = 60%

	XC4005XL	XC4XXXXL
	Dynamic	
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Lots:	1	1
Failures:	0	0
Device on test:	43	43
Actual device hours:	152,908	152,908
Mean :	3,556	3,556
Equivalent device hours @ Tj=125C:	405,719	405,719
Equivalent device hours @ Tj=55C:	10,675,223	10,675,223
Equivalent device hours @ Tj=25C:	3.80E+08	3.80E+08
Failure Analysis:		
Failure Rate (60% C.L.) in FITS @ Tj=55C:		29
Failure Rate (60% C.L.) in FITS @ Tj=25C:		2

Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XC4XXXXV Microcircuit Group
Package Type:	PG-299, PG-599
Actual Temperature:	145C +8C/-0C
Actual Voltage:	2.7V +/-0.3(Core);3.6V+/-0.3(I/O)
Assumed Activation Energy:	0.70 ev @ C.L. = 60%

	XC4036XV	XC40110XV	XC40125XV	XC40150XV	XC4XXXXV
Period:	Jan. 1, 1998 to Jan. 1, 2000				
Combined Lots:	2	1	1	1	5
Failures:	0	0	0	0	0
Device on test:	90	15	20	22	147
Actual device hours:	91,170	32,460	9,884	23,276	156,790
Mean :	1,013	2,164	494	1,058	1,067
Equivalent device hours @ Tj=125C:	241,906	86,128	26,226	61,759	416,019
Equivalent device hours @ Tj=55C:	18,781,528	6,686,941	2,036,159	4,794,986	32,299,613
Equivalent device hours @ Tj=25C:	2.27E+08	8.07E+07	2.46E+07	5.79E+07	3.90E+08

Failure Analysis:		
	Failure Rate (60% C.L.) in FITS @ Tj=55C:	28
	Failure Rate (60% C.L.) in FITS @ Tj=25C:	2

Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC4XXXXLA Microcircuit Group**
Package Type:	**PGA-223, HQFP-208, 240**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**3.6V +/-0.3**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

	XC4036XLA	XC4044XLA	XC4062XLA
Period:	**Jan. 1, 1998 to Jan. 1, 2000**		
Combined Lots:	4	1	2
Failures:	1	0	0
Device on test:	226	42	84
Actual device hours:	170,421	44,394	65,717
Mean :	754	1,057	782
Equivalent device hours @ Tj=125C:	452,187	117,793	174,371
Equivalent device hours @ Tj=55C:	35,107,675	9,145,411	13,538,068
Equivalent device hours @ Tj=25C:	4.24E+08	1.10E+08	1.63E+08
Failure Analysis:	F/A98091(1)-RAND		

Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC4XXXXLA Microcircuit Group**
Package Type:	**PGA-223, HQFP-208, 240**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**3.6V +/-0.3**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

	XC4085XLA	XC40XXXLA
Period:	**Jan. 1, 1998 to Jan. 1, 2000**	
Combined Lots:	**1**	**8**
Failures:	**0**	**1**
Device on test:	**37**	**389**
Actual device hours:	**23,828**	**304,360**
Mean :	**644**	**782**
Equivalent device hours @ Tj=125C:	**63,224**	**807,575**
Equivalent device hours @ Tj=55C:	**4,908,701**	**62,699,855**
Equivalent device hours @ Tj=25C:	**5.92E+07**	**7.57E+08**
Failure Analysis:		

Failure Rate (60% C.L.) in FITS @ Tj=55C: 32
Failure Rate (60% C.L.) in FITS @ Tj=25C: 3

Reliability Testing Summary
High Temperature Life Test
Qualification

Technology:	Si Gate CMOS
Device Type:	XCVXXX Microcircuit Group
Package Type:	HQFP-240, PQFP-240
Actual Temperature	145C +8C/-0C
Actual Voltage:	2.625V (Core); 3.6V (I/O)
Assumed Activation Energy:	0.70 ev @ C.L. = 60%

Period: Jan. 1, 1998 to Jan. 1, 2000

	XCV50	XCV100	XCV150	XCV200	XCV300
Combined Lots:	1	1	1	2	3
Failures:	0	0	0	1	1
Device on test:	66	76	76	152	157
Actual device hours:	33,000	76,836	39,216	129,974	215,022
Mean :	500	1,011	516	855	1,370
Equivalent device hours @ Tj=125C:	87,561	203,873	104,054	344,867	570,530
Equivalent device hours @ Tj=55C:	6,798,184	15,828,644	807,714	26,775,368	44,295,730
Equivalent device hours @ Tj=25C:	8.21E+07	1.91E+08	9.75E+07	3.23E+08	5.35E+08
Failure Analysis:				F/A99095(1)-NDF	F/A99029(1)-PFSM

Reliability Testing Summary
High Temperature Life Test
Qualification

Technology:	Si Gate CMOS
Device Type:	XCVXXX Microcircuit Group
Package Type:	HQFP-240, PQFP-240
Actual Temperature	145C +8C/-0C
Actual Voltage:	2.625V (Core); 3.6V (I/O)
Assumed Activation Energy:	0.70 ev @ C.L. = 60%

	XCV400	XCV600	XCV800	XCV1000	XCVXXX
Period:			Jan. 1, 1998 to Jan. 1, 2000		
Combined Lots:	1	1	2	3	15
Failures:	0	0	0	2	4
Device on test:	76	22	42	60	727
Actual device hours:	76,380	44,176	54,495	85,284	754,383
Mean :	1,005	2,006	1,298	1,421	1,038
Equivalent device hours @ Tj=125C:		117,215	144,595	226,289	2,001,646
Equivalent device hours @ Tj=55C:		9,100,502	11,226,274	17,568,979	155,407,100
Equivalent device hours @ Tj=25C:		1.10E+08	1.36E+08	2.12E+08	1.88E+09
Failure Analysis:				F/A99035(2)-NDF	
Failure Rate(60% C.L.) in FITS @ Tj=55C:					34
Failure Rate(60% C.L.) in FITS @ Tj=25C:					3

Reliability Testing Summary
High Temperature Life Test
Qualification

Technology:	Si Gate CMOS
Device Type:	XCVXXXE Microcircuit Group
Package Type:	HQFP-240, PQFP-240
Actual Temperature	145C +8C/-0C
Actual Voltage:	1.89V (Core); 3.6V (I/O)
Assumed Activation Energy:	0.70 ev @ C.L. = 60%

	XCV300E	XCV1000E	XCVXXXE
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Lots:	1	1	2
Failures:	1	0	1
Device on test:	75	22	97
Actual device hours:	75,227	22,154	97,381
Mean :	1,003	1,007	1,004
Equivalent device hours @ Tj=125C:	199,604	58,782	258,386
Equivalent device hours @ Tj=55C:	15,497,181	4,563,847	20,061,028
Equivalent device hours @ Tj=25C:	1.87E+08	5.51E+07	2.42E+08
Failure Analysis:	F/A99266(1)-FANC		
Failure Rate(60% C.L.) in FITS @ Tj=55C:			100
Failure Rate(60% C.L.) in FITS @ Tj=25C:			8

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XC5XXX Microcircuit Group
Package Type:	PLCC-84, PGA-223, PQFP-240
Actual Temperature:	145C +8C/-0C
Actual Voltage:	5.7V +/-0.25
Assumed Activation Energy:	0.70 ev @ C.L. = 60%

	XC5202	XC5204	XC5210	XC5XXX
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Lots:	2	4	4	10
Failures:	0	0	0	0
Device on test:	90	261	236	587
Actual device hours:	80,550	589,311	246,360	916,221
Mean :	895	2,258	1,044	1,561
Equivalent device hours @ Tj=125C:	213,728	1,563,651	653,680	2,431,059
Equivalent device hours @ Tj=55C:	16,593,749	121,401,349	50,751,532	188,746,629
Equivalent device hours @ Tj=25C:	2.00E+08	1.47E+09	6.13E+08	2.28E+09

Failure Analysis:

Failure Rate (60% C.L.) in FITS @ Tj=55C:	5
Failure Rate (60% C.L.) in FITS @ Tj=25C:	0.4

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC3XXX/A, XC4XXX/E, XC4XXXXL
Package Type: Various
Test Condition: T=85C, R.H.=85%
Bias Voltages: 5.0V +/- .25V
* 3.3V +/-0.3V **2.7V +/-.3V

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC3XXX/A	XC4XXX	XC4XXXE	XC4XXXXL*
Combined Started Lot:	3	8	11	9
Combined Completed Lots:	3	8	11	9
Failures:	0	0	0	0
Device on test:	140	604	506	344
Mean Test Hour s/Device:	1,049	1,011	900	1,036
Total Device Hours:	146,920	610,744	455,288	356,247

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XC4XXXXL, XC4XXXXV, XC4XXXXLA, XCSXX, XC5XXX
Package Type:	Various
Test Condition:	T=85C, R.H.=85%
Bias Voltages:	5.0V +/- .25V
	* 3.3V +/-0.3V **2.7V +/-.3V

	XCVXXX**	XC4XXXXV**	XC4XXXXLA	XCSXX	XC5XXX
Period:	Jan. 1, 1998 to Jan. 1, 2000				
Combined Started Lot:	2	1	2	1	2
Combined Completed Lots:	2	1	2	1	2
Failures:	0	0	0	0	0
Device on test:	59	74	120	45	90
Mean Test Hour s/Device:	1,259	1,084	1,014	832	1,047
Total Device Hours:	74,255	80,216	121,716	37,440	94,230

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC3XXX/A Microcircuit Group**
Package Type:	**PQFP-100, VQFP-64,100**
Test Condition:	**T = 85C, R.H. = 85%**
Bias Voltages:	**5.0V +/- .25V**

	XC3030/A	XC3042/A	XC3XXX/A
Period:		**Jan. 1, 1998 to Jan. 1, 2000**	
Combined Started Lot:	2	1	3
Combined Completed Lots:	2	1	3
Failures:	0	0	0
Device on test:	95	45	140
Mean Test Hour s/Device:	1,017	1,117	1,049
Total Device Hours:	96,655	50,265	146,920
Failure Analysis Number:			

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXX Microcircuit Group
Package Type: PLCC-84, BGA-225
PQFP- 240 & TQFP-100
Test Condition: T = 85C, R.H. = 85%
Bias Voltages: 5.0V +/- .25V

	XC4005	XC4010	XC4013	XC4XXX
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Started Lot:	1	4	3	8
Combined Completed Lots:	1	4	3	8
Failures:	0	0	0	0
Device on test:	75	303	226	604
Mean Test Hour s/Device:	1,005	1,004	1,023	1,011
Total Device Hours:	75,375	304,125	231,244	610,744
Failure Analysis Number:				

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXE Microcircuit Group
Package Type: PQFP-208, 240, PLCC-84, HQFP- 240, BGA-225, VQFP-100, TQFP-144
Test Condition: T = 85C, R.H. = 85%
Bias Voltages: 5.0V +/- .25V

	XC4003E	XC4006E	XC4010E
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	1	2	2
Combined Completed Lots:	1	2	2
Failures:	0	0	0
Device on test:	45	66	86
Mean Test Hour s/Device:	784	1,001	1,115
Total Device Hours:	35,280	66,045	95,899
Failure Analysis Number:			

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXE Microcircuit Group
Package Type: PQFP-208, 240, PLCC-84, HQFP- 240, BGA-225, VQFP-100, TQFP-144
Test Condition: T = 85C, R.H. = 85%
Bias Voltages: 5.0V +/- .25V

	XC4013E	XC4025E	XC4XXXE
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	4	2	11
Combined Completed Lots:	4	2	11
Failures:	0	0	0
Device on test:	211	98	506
Mean Test Hour s/Device:	750	1,018	900
Total Device Hours:	158,260	99,804	455,288
Failure Analysis Number:			

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXL Microcircuit Group
Package Type: HQFP-208,240, BGA-560, PQFP-240, HT-144
Test Condition: T = 85C, R.H. = 85%
Bias Voltages: 3.3V +/- .3V

	XC4013XL	XC4020XL	XC4036XL
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	1	2	2
Combined Completed Lots:	1	2	2
Failures:	0	0	0
Device on test:	45	90	121
Mean Test Hour s/Device:	1,019	1,039	1,030
Total Device Hours:	45,855	93,510	124,680
Failure Analysis Number:			

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXL Microcircuit Group
Package Type: HQFP-208,240, BGA-560, PQFP-240, HT-144
Test Condition: T = 85C, R.H. = 85%
Bias Voltages: 3.3V +/- .3V

	XC4062XL	XC4085XL	XC4XXXXL
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	2	2	9
Combined Completed Lots:	2	2	9
Failures:	0	0	0
Device on test:	46	42	344
Mean Test Hour s/Device:	1,016	1,082	1,036
Total Device Hours:	46,752	45,450	356,247
Failure Analysis Number:			

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXV Microcircuit Group
Package Type: HQFP-240
Test Condition: T = 85C, R.H. = 85%
Bias Voltages: 2.7V +/- .3V

	XC4036XV	XC4XXXXV
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	74	74
Mean Test Hour s/Device:	1,084	1,084
Total Device Hours:	80,216	80,216
Failure Analysis Number:		

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XCSXX Microcircuit Group**
Package Type:	**PQFP-240**
Test Condition:	**T = 85C, R.H. = 85%**
Bias Voltages:	**5.07V +/- .25V**

	XCS30	**XCSXX**
Period:	**Jan. 1, 1998 to Jan. 1, 2000**	
Combined Started Lot:	**1**	**1**
Combined Completed Lots:	**1**	**1**
Failures:	**0**	**0**
Device on test:	**45**	**45**
Mean Test Hour s/Device:	**832**	**832**
Total Device Hours:	**37,440**	**37,440**
Failure Analysis Number:		

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC4XXXXLA Microcircuit Group**
Package Type:	**HQFP-208, 240**
Test Condition:	**T = 85C, R.H. = 85%**
Bias Voltages:	**3.3V +/- .3V**

	XC4036XLA	XC4062XLA	XC4XXXXLA
Period:		**Jan. 1, 1998 to Jan. 1, 2000**	
Combined Started Lot:	**1**	**1**	**2**
Combined Completed Lots:	**1**	**1**	**2**
Failures:	**0**	**0**	**0**
Device on test:	**76**	**44**	**120**
Mean Test Hour s/Device:	**1,022**	**1,001**	**1,014**
Total Device Hours:	**77,672**	**44,044**	**121,716**
Failure Analysis Number:			

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XCVXXX Microcircuit Group**
Package Type:	**HQFP-208, 240**
Test Condition:	**T = 85C, R.H. = 85%**
Bias Voltages:	**2.7V +/- .3V**

	XCV100	XCV800	XCVXXX
Period:		Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	1	1	2
Combined Completed Lots:	1	1	2
Failures:	0	0	0
Device on test:	43	16	59
Mean Test Hour s/Device:	1,293	1,166	1,259
Total Device Hours:	55,599	18,656	74,255
Failure Analysis Number:			

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC5XXX Microcircuit Group**
Package Type:	**PQFP-208, TQFP-144**
Test Condition:	**T = 85C, R.H. = 85%**
Bias Voltages:	**5.0V +/- .25V**

	XC5204	XC5206	XC5XXX
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	1	1	2
Combined Completed Lots:	1	1	2
Failures:	0	0	0
Device on test:	45	45	90
Mean Test Hour s/Device:	1,056	1,038	1,047
Total Device Hours:	47,520	46,710	94,230
Failure Analysis Number:			

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC3XXX/A, XC31XX/A, XC4XXX/E
Package Type: Various
Test Condition: T=121C; 2 atm. sat. steam

	XC3XXX/A	XC31XX/A	XC4XXX	XC4XXXE
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Started Lot:	5	1	13	15
Combined Completed Lots:	5	1	13	15
Failures:	0	0	0	0
Device on test:	256	45	863	603
Mean Test Hour s/Device:	128	96	145	138
Total Device Hours:	32,880	4,320	125,472	83,232

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXEX XCSXXXL, XC4XXXXL
Package Type: Various
Test Condition: T=121C; 2 atm. sat. steam

	XC4XXXEX	XCSXXXL	XC4XXXXL
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	2	2	17
Combined Completed Lots:	2	2	17
Failures:	1	0	0
Device on test:	119	117	551
Mean Test Hour s/Device:	96	96	119
Total Device Hours:	11,424	11,232	65,424

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXV,XC4XXXXLA, XCVXXX, XC5XXX
Package Type: Various
Test Condition: T=121C; 2 atm. sat. steam

	XC4XXXXV	XC4XXXXLA	XCVXXX	XC5XXX

	XC4XXXXV	XC4XXXXLA	XCVXXX	XC5XXX
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Started Lot:	2	3	8	3
Combined Completed Lots:	2	3	8	3
Failures:	0	0	0	2
Device on test:	59	84	291	135
Mean Test Hour s/Device:	96	96	137	96
Total Device Hours:	5,664	8,064	38,304	12,960

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC3XXX/A Microcircuit Group
Package Type: PLCC-44, 68, VQFP-64, 100, PQFP-100
Test Condition: T = 121C; 2 atm. sat. steam.

	XC3030/A	XC3042/A	XC3XXX/A
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	4	1	5
Combined Completed Lots:	4	1	5
Failures:	0	0	0
Device on test:	211	45	256
Mean Test Hour s/Device:	135	96	128
Total Device Hours:	28,560	4,320	32,880
Failure Analysis Number:			

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC31XX/A Microcircuit Group
Package Type: TQFP-176
Test Condition: T = 121C; 2 atm. sat. steam.

	XC3190/A	XC31XX/A
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	45	45
Mean Test Hour s/Device:	96	96
Total Device Hours:	4,320	4,320
Failure Analysis Number:		

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXX Microcircuit Group
Package Type: PQFP-160, 240, HQFP- 240
PLCC-84, BGA-225, & TQFP-144, 176
Test Condition: T = 121C; 2 atm. sat. steam

	XC4005	XC4006	XC4010/L	XC4013	XC4XXX
Period:	Jan. 1, 1998 to Jan. 1, 2000				
Combined Started Lot:	1	1	7	4	13
Combined Completed Lots:	1	1	7	4	13
Failures:	0	0	0	0	0
Device on test:	75	44	440	304	863
Mean Test Hour s/Device:	168	96	143	150	145
Total Device Hours:	12,600	4,224	63,048	45,600	125,472
Failure Analysis Number:					

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXE Microcircuit Group
Package Type: HQFP-240, PQFP-208, 240, BGA-225, TQFP-144, VQFP-100, PLCC-84
Test Condition: T = 121C; 2 atm. sat. steam

	XC4003E	XC4005E	XC4006E
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	1	1	1
Combined Completed Lots:	1	1	1
Failures:	0	0	0
Device on test:	44	44	43
Mean Test Hour s/Device:	168	96	96
Total Device Hours:	7,392	4,224	4,128
Failure Analysis Number:			

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXE Microcircuit Group
Package Type: HQFP-240, PQFP-208, 240, BGA-225, TQFP-144, VQFP-100, PLCC-84
Test Condition: T = 121C; 2 atm. sat. steam

	XC4010E	XC4013E	XC4025E	XC4XXXE
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Started Lot:	2	5	5	15
Combined Completed Lots:	2	5	5	15
Failures:	0	0	0	0
Device on test:	78	198	196	603
Mean Test Hour s/Device:	96	137	168	138
Total Device Hours:	7,488	27,072	32,928	83,232
Failure Analysis Number:				

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXEX Microcircuit Group
Package Type: BGA-352
Test Condition: T = 121C; 2 atm. sat. steam

	XC4028EX	XC4036EX	XC4XXXEX
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	1	1	2
Combined Completed Lots:	1	1	2
Failures:	1	0	1
Device on test:	44	75	119
Mean Test Hour s/Device:	96	96	96
Total Device Hours:	4,224	7,200	11,424
Failure Analysis Number:	F/A98003(1)-FANC		

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCSXXXL Microcircuit Group
Package Type: VQFP-100, CS-280
Test Condition: T = 121C; 2 atm. sat. steam

	XCS30XL	XCS40XL	XCSXXXL
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	1	1	2
Combined Completed Lots:	1	1	2
Failures:	0	0	0
Device on test:	76	41	117
Mean Test Hour s/Device:	96	96	96
Total Device Hours:	7,296	3,936	11,232
Failure Analysis Number:			

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XC4XXXXL Microcircuit Group
Package Type:	HQFP-240, BGA-256,352, 432, 560 TQFP-176, HT-144
Test Condition:	T = 121C; 2 atm. sat. steam

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC4010XL	XC4013XL	XC4020XL	XC4036XL
Combined Started Lot:	1	2	3	4
Combined Completed Lots:	1	2	3	4
Failures:	0	0	0	0
Device on test:	76	90	137	54
Mean Test Hour s/Device:	168	96	136	96
Total Device Hours:	12,768	8,640	18,624	5,184
Failure Analysis Number:				

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC4XXXXL Microcircuit Group**
Package Type:	**HQFP-240, BGA-256,352, 432, 560 TQFP-176, HT-144**
Test Condition:	**T = 121C; 2 atm. sat. steam**

	XC4052XL	XC4062XL	XC4085XL	XC4XXXXL
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Started Lot:	1	4	2	17
Combined Completed Lots:	1	4	2	17
Failures:	0	0	0	0
Device on test:	31	135	28	551
Mean Test Hour s/Device:	96	108	96	119
Total Device Hours:	2,976	14,544	2,688	65,424
Failure Analysis Number:				

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXV Microcircuit Group
Package Type: BGA-560
Test Condition: T = 121C; 2 atm. sat. steam

	XC40125XV	XC4XXXXV
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	2	2
Combined Completed Lots:	2	2
Failures:	0	0
Device on test:	59	59
Mean Test Hour s/Device:	96	96
Total Device Hours:	5,664	5,664
Failure Analysis Number:		

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXLA Microcircuit Group
Package Type: BGA-560, HQFP-304
Test Condition: T = 121C; 2 atm. sat. steam

	XC4044XLA	XC4062XLA	XC4085XLA	XC4XXXXLA
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Started Lot:	1	1	1	3
Combined Completed Lots:	1	1	1	3
Failures:	0	0	0	0
Device on test:	31	22	31	84
Mean Test Hour s/Device:	96	96	96	96
Total Device Hours:	2,976	2,112	2,976	8,064
Failure Analysis Number:				

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCVXXX Microcircuit Group
Package Type: CS-144, FG-256, 556, 676, 680, TQFP-144, HQFP-240
Test Condition: T = 121C; 2 atm. sat. steam

	XCV100	XCV200	XCV800	XCV1000	XCVXXX
Period:	Jan. 1, 1998 to Jan. 1, 2000				
Combined Started Lot:	2	2	2	2	8
Combined Completed Lots:	2	2	2	2	8
Failures:	0	0	0	0	0
Device on test:	122	72	44	53	291
Mean Test Hour s/Device:	168	96	96	126	137
Total Device Hours:	20,496	6,912	4,224	6,672	38,304
Failure Analysis Number:					

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC5XXX Microcircuit Group
Package Type: PQFP-160, 208, TQFP-144
Test Condition: T = 121C; 2 atm. sat. steam

	XC5204	XC5206	XC5XXX
Period:		Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	1	2	3
Combined Completed Lots:	1	2	3
Failures:	0	2	2
Device on test:	45	90	135
Mean Test Hour s/Device:	96	96	96
Total Device Hours:	4,320	8,640	12,960
Failure Analysis Number:		F/A98043(2)-MST	

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC3XXX/A, XC31XX/A, XC4XXX/E, XCSXX**
Package Type:	**Various**
Test Condition:	**T = -65C / +150C (Air to Air)**

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC3XXX/A	XC31XX/A	XCSXX	XC4XXX	XC4XXXE
Combined Started Lot:	6	1	3	12	13
Combined Completed Lots:	6	1	3	12	13
Failures:	0	0	0	0	0
Device on test:	328	45	89	761	663
Mean Test Cycles/Device:	1,081	1,004	1,019	1,063	985
Total Device Cycles:	354,483	45,180	90,721	809,273	653,035
Failure Analysis Number:					

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXV, XC4XXXXL, XC4XXXEX,XC4XXXXLA, XC5XXX
Package Type: Various
Test Condition: T = -65C / +150C (Air to Air)
T = -55C / +125C (Air to Air) for BGA

	XC4XXXEX	XC4XXXXL	XC4XXXXLA	XC4XXXXV	XC5XXX
Period:			Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	6	17	8	4	4
Combined Completed Lots:	6	17	8	1	4
Failures:	0	1	0	0	0
Device on test:	256	582	378	170	180
Mean Test Cycles/Device:	1,003	982	932	1,017	1,045
Total Device Cycles:	256,691	586,589	352,214	172,918	188,055
Failure Analysis Number:					

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCSXXXXL, XCVXXX
Package Type: Various
Test Condition: T = -65C / +150C (Air to Air)
T = -55C / +125C (Air to Air) for BGA

	XCSXXXXL	XCVXXX	XCVXXXE
Period:			
Combined Started Lot:	4	15	2
Combined Completed Lots:	4	15	2
Failures:	0	0	0
Device on test:	192	489	97
Mean Test Cycles/Device:	1,026	960	645
Total Device Cycles:	197,044	469,408	62,516
Failure Analysis Number:			

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC3XXX/A Microcircuit Group
Package Type: PLCC- 44, 68, VQFP-64, 100, PQFP-100
Test Condition: T = -65C/+150C (Air to Air)

	XC3030/A	XC3042/A	XC3XXX/A
Period:		Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	5	1	6
Combined Completed Lots:	5	1	6
Failures:	0	0	0
Device on test:	283	45	328
Mean Test Cycles/Device:	1,077	1,103	1,081
Total Device Cycles:	304,848	49,635	354,483
Failure Analysis Number:			

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC31XX/A Microcircuit Group**
Package Type:	**TQFP-176**
Test Condition:	**T = -65C/+150C (Air toAir)**

	XC3190/A	XC31XX/A
Period:	**Jan. 1, 1998 to Jan. 1, 2000**	
Combined Started Lot:	**1**	**1**
Combined Completed Lots:	**1**	**1**
Failures:	**0**	**0**
Device on test:	**45**	**45**
Mean Test Cycles/Device:	**1,004**	**1,004**
Total Device Cycles:	**45,180**	**45,180**
Failure Analysis Number:		

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCSXX Microcircuit Group
Package Type: TQFP-144,VQFP-100, PQFP-240
Test Condition: T = -65C/+150C (Air toAir)

	XCS30	XCSXX
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	3	3
Combined Completed Lots:	3	3
Failures:	0	0
Device on test:	89	89
Mean Test Cycles/Device:	1,019	1,019
Total Device Cycles:	90,721	90,721
Failure Analysis Number:		

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXX Microcircuit Group
Package Type: PQFP-160, 240, HQFP-240, TQFP-144, 176
PLCC-84, VQFP-100, BG-225
Test Condition: T = -65C/+150C (Air to Air)
*For BGA, T=-55C/+125C (Air to Air)

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC4005	XC4006	XC4010
Combined Started Lot:	1	1	5
Combined Completed Lots:	1	1	5
Failures:	0	0	0
Device on test:	76	45	259
Mean Test Cycle/Device:	1,010	1,004	1,119
Total Device Cycles:	76,760	45,180	289,760

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXX Microcircuit Group
Package Type: PQFP-160, 240, HQFP-240, TQFP-144, 176
PLCC-84, BGA-225
Test Condition: T = -65C/+150C (Air to Air)
*For BGA, T=-55C/+125C (Air to Air)

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC4010*	XC4013	XC4013*	XC4XXX
Combined Started Lot:	1	3	1	12
Combined Completed Lots:	1	3	1	12
Failures:	0	0	0	0
Device on test:	76	229	76	761
Mean Test cycles/Device:	676	1,175	1,014	1,063
Total Device Cycles:	51,376	269,133	77,064	809,273

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXE Microcircuit Group
Package Type: PQFP-240, TQFP-144, HQFP-240, BGA-225
Test Condition: T = -65C/+150C (Air to Air)
*For BGA, T=-55C/+125C (Air to Air)

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC4006E	XC4010E	XC4010E*
Combined Started Lot:	1	1	1
Combined Completed Lots:	1	1	1
Failures:	0	0	0
Device on test:	45	45	45
Mean Test Cycles/Device:	1,096	518	1,063
Total Device Cycles:	49,320	23,310	47,835

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXE Microcircuit Group
Package Type: PQFP-240, TQFP-144, HQFP-240, BGA-225
Test Condition: T = -65C/+150C (Air to Air)
*For BGA, T=-55C/+125C (Air to Air)

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC4013E	XC4025E	XC4XXXE
Combined Started Lot:	4	6	13
Combined Completed Lots:	4	6	13
Failures:	0	0	0
Device on test:	208	320	663
Mean Test Cycles/Device:	991	1,020	985
Total Device Cycles:	206,138	326,432	653,035

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXEX Microcircuit Group
Package Type: HQFP-240, BGA-352
Test Condition: T = -65C/+150C (Air to Air)
*For BGA, T=-55C/+125C (Air to Air)

	XC4028EX*	XC4028EX	XC4036EX*	XC4XXXEX
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Started Lot:	1	4	1	6
Combined Completed Lots:	1	4	1	6
Failures:	0	0	0	0
Device on test:	45	135	76	256
Mean Test cycles/Device:	605	1,137	1,000	1,003
Total Device Cycles:	27,225	153,466	76,000	256,691

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXL Microcircuit Group
Package Type: HQFP-240, BGA-256,352,432, 560, HT-144
PQFP-,240, TQFP-176
Test Condition: T = -65C/+150C (Air to Air)
*For BGA, T=-55C/+125C (Air to Air)

	XC4010XL	XC4013XL	XC4020XL	XC4020XL*
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Started Lot:	1	1	1	1
Combined Completed Lots:	1	1	1	1
Failures:	0	0	0	0
Device on test:	76	45	45	75
Mean Test Cycles/Device:	1,065	1,006	1,094	1,087
Total Device cycles:	80,940	45,270	49,230	81,525

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXL Microcircuit Group
Package Type: HQFP-240, BGA-256,352,432, 560, HT-144
PQFP-,240, TQFP-176
Test Condition: T = -65C/+150C (Air to Air)
*For BGA, T=-55C/+125C (Air to Air)

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC4028XL	XC4036XL*	XC4052XL*	XC4062XL
Combined Started Lot:	2	4	1	1
Combined Completed Lots:	2	4	1	1
Failures:	0	0	0	1
Device on test:	85	54	32	45
Mean Test Cycles/Device:	1,000	1,014	1,000	1,005
Total Device cycles:	85,000	54,748	32,000	45,225

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Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXL Microcircuit Group
Package Type: HQFP-240, BGA-256,352,432, 560, HT-144
PQFP-,240, TQFP-176
Test Condition: T = -65C/+150C (Air to Air)
*For BGA, T=-55C/+125C (Air to Air)

	XC4062XL*	XC4085XL*	XC4XXXXL
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	2	3	17
Combined Completed Lots:	2	3	17
Failures:	0	0	1
Device on test:	63	77	597
Mean Test Cycles/Device:	1,002	643	982
Total Device cycles:	63,176	49,475	586,589

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXLA Microcircuit Group
Package Type: HQFP-240, 304, PQFP-240
Test Condition: T = -65C/+150C (Air to Air)

	XC4013XLA	XC4036XLA	XC4044XLA
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	1	3	1
Combined Completed Lots:	1	3	1
Failures:	0	0	0
Device on test:	45	190	45
Mean Test Cycles/Device:	1,042	839	1,017
Total Device Cycles:	46,890	159,322	45,765

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXLA Microcircuit Group
Package Type: HQFP-240,
Test Condition: T = -65C/+150C (Air to Air)

	XC4062XLA	XC4085XLA	XC4XXXXLA
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	1	2	8
Combined Completed Lots:	1	2	8
Failures:	0	0	0
Device on test:	41	57	378
Mean Test Cycles/Device:	1,011	1,031	932
Total Device Cycles:	41,451	58,786	352,214

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXV Microcircuit Group
Package Type: HQFP-240, BGA-560
Test Condition: T = -65C/+150C (Air to Air)
*For BGA, T=-55C/+125C (Air to Air)

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC4036XV	XC40125XV*	XC40150XV*	XC4XXXXV
Combined Started Lot:	1	2	1	4
Combined Completed Lots:	1	2	1	1
Failures:	0	0	0	0
Device on test:	75	65	30	170
Mean Test Cycles/Device:	1,026	1,015	1,000	1,017
Total Device Cycles:	76,950	65,968	30,000	172,918

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCSXXXXL Microcircuit Group
Package Type: CS-280, PQFP-240, VQFP-100
Test Condition: T = -65C/+150C (Air to Air)
*For CS, T=-55C/+125C (Air to Air)

	XCS30XXL	XCS40XL	XCSXXXXL
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	3	1	4
Combined Completed Lots:	3	1	4
Failures:	0	0	0
Device on test:	151	41	192
Mean Test Cycles/Device:	1,033	1,000	1,026
Total Device Cycles:	156,044	41,000	197,044

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XC4XXXXLA Microcircuit Group
Package Type:	HQFP-240, CS-144, TQFP-144, PQFP-240 FG-256,556,676, BGA-432-560
Test Condition:	T = -65C/+150C (Air to Air) *For CS, BGA,FG, T=-55C/+125C (Air to Air)

	XCV100	XCV100*	XCV200*	XCV300
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Started Lot:	1	1	2	3
Combined Completed Lots:	1	1	2	3
Failures:	0	0	0	0
Device on test:	60	62	72	117
Mean Test Cycles/Device:	1,016	1,085	1,000	841
Total Device Cycles:	60,960	67,270	72,000	98,376

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXLA Microcircuit Group
Package Type: HQFP-240, CS-144, TQFP-144, PQFP-240
FG-256,556,676, BGA-432-560
Test Condition: T = -65C/+150C (Air to Air)
*For CS, BGA,FG, T=-55C/+125C (Air to Air)

	XCV800	XCV800*	XCV1000	XCV1000*	XCVXXX
Period:	Jan. 1, 1998 to Jan. 1, 2000				
Combined Started Lot:	1	3	1	3	15
Combined Completed Lots:	1	3	1	3	15
Failures:	0	0	0	0	0
Device on test:	22	50	28	78	489
Mean Test Cycles/Device:	549	1,000	1,069	1,010	960
Total Device Cycles:	12,078	50,000	29,932	78,792	469,408

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCVXXXE Microcircuit Group
Package Type: HQFP-240, PQFP-240
Test Condition: T = -65C/+150C (Air to Air)

	XCV300E	XCV1000E	XCVXXX
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	1	1	2
Combined Completed Lots:	1	1	2
Failures:	0	0	0
Device on test:	73	24	97
Mean Test Cycles/Device:	500	1,084	645
Total Device Cycles:	36,500	26,016	62,516

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XC5XXX Microcircuit Group
Package Type:	VQFP-100, TQFP-144, PQFP-160, 208
Test Condition:	T = -65C/+150C (Air to Air)

	XC5202	XC5204	XC5206	XC5XXX
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Started Lot:	1	1	2	4
Combined Completed Lots:	1	1	2	4
Failures:	0	0	0	0
Device on test:	45	45	90	180
Mean Test Cycles/Device:	1,000	1,040	1,070	1,045
Total Device Cycles:	45,000	46,800	96,255	188,055
Failure Analysis Number:				

Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXX/E, XC4XXXXLA Microcircuit Group
Package Type: Various
Test Condition: T = 130C, R.H. = 85%, 3ATM
Bias Voltage: 5.0V +/- .25V, 3.3V+/-.25V, 2.7V+/-.25V

	XC4XXX	XC4XXXE	XC4XXXXLA
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	5	4	3
Combined Completed Lots:	5	4	3
Failures:	0	0	0
Device on test:	90	46	48
Mean Test Hours/Device:	153	226	275
Total Device Hours:	13,800	10,400	13,200

Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXV,XCVXXX, XCSXXX Microcircuit Group
Package Type: Various
Test Condition: T = 130C, R.H. = 85%, 3ATM
Bias Voltage: 5.0V +/- .25V, 3.3V+/-.25V, 2.7V+/-.25V

	XC4XXXXV	XCVXXX	XCSXXX	XCSXXXL
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Started Lot:	1	9	1	1
Combined Completed Lots:	1	9	1	1
Failures:	0	0	0	0
Device on test:	12	149	13	27
Mean Test Hours/Device:	300	195	100	148
Total Device Hours:	3,600	29,000	1,300	4,000

Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXX Microcircuit Group
Package Type: PQFP-240, PLCC-84, HQFP-240
Test Condition: T = 130C, R.H. = 85%, 3ATM
Bias Voltage: 5.0V +/- .25V

	XC4010	XC4013	XC4XXX
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	3	2	5
Combined Completed Lots:	3	2	5
Failures:	0	0	0
Device on test:	66	24	90
Mean Test Hours/Device:	100	300	153
Total Device Hours:	6,600	7,200	13,800

Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXE Microcircuit Group
Package Type: PQFP-240
Test Condition: T = 130C, R.H. = 85%, 3ATM
Bias Voltage: 5.0V +/- .25V

	XC4025E	XC4XXXE
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	4	4
Combined Completed Lots:	4	4
Failures:	0	0
Device on test:	46	46
Mean Test Hours/Device:	226	226
Total Device Hours:	10,400	10,400

Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXLA Microcircuit Group
Package Type: HQFP-240
Test Condition: T = 130C, R.H. = 85%, 3ATM
Bias Voltage: 3.3V +/- .25V

	XC4036XLA	XC4XXXXLA
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	3	3
Combined Completed Lots:	3	3
Failures:	0	0
Device on test:	48	48
Mean Test Hours/Device:	275	275
Total Device Hours:	13,200	13,200

Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC4XXXXV Microcircuit Group**
Package Type:	**HQFP-240**
Test Condition:	**T = 130C, R.H. = 85%, 3ATM**
Bias Voltage:	**2.7V +/- .25V**

	XC40150XV	XC4XXXXV
Period:	**Jan. 1, 1998 to Jan. 1, 2000**	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	12	12
Mean Test Hours/Device:	300	300
Total Device Hours:	3,600	3,600

Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCVXXX Microcircuit Group
Package Type: PQFP-240, HQFP-240, FG-256,556, BGA-560
Test Condition: T = 130C, R.H. = 85%, 3ATM
Bias Voltage: 2.7V +/- .25V

	XCV200	XCV300	XCV800	XCV1000	XCVXXX
Period:	Jan. 1, 1998 to Jan. 1, 2000				
Combined Started Lot:	2	2	2	3	9
Combined Completed Lots:	2	2	2	3	9
Failures:	0	0	0	0	0
Device on test:	42	48	35	24	149
Mean Test Hours/Device:	150	200	226	217	195
Total Device Hours:	6,300	9,600	7,900	5,200	29,000

Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XCSXXX Microcircuit Group
Package Type:	PQFP-240
Test Condition:	T = 130C, R.H. = 85%, 3ATM
Bias Voltage:	2.7V +/- .25V

	XCS40	XCSXXX
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	13	13
Mean Test Hours/Device:	100	100
Total Device Hours:	1,300	1,300

Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCSXXX Microcircuit Group
Package Type: CS-280
Test Condition: T = 130C, R.H. = 85%, 3ATM
Bias Voltage: 2.7V +/- .25V

	XCS40XL	XCSXXXL
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	27	27
Mean Test Hours/Device:	148	148
Total Device Hours:	4,000	4,000

The Coolrunner Products

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Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XCR3960
Package Type:	BG492
Actual Temperature:	125C
Actual Voltage:	3.6V
Assumed Activation Energy:	0.7 ev @ C.L. = 60%

	XCR3960
Combined Lots:	3
Failures:	2
Device on test:	198
Actual device hours:	198,000
Mean :	1,000
Equivalent device hours @ Tj=70C:	5,209,747
Equivalent device hours @ Tj=55C:	15,372,654
Equivalent device hours @ Tj=25C:	1.86E+08
Failure Rate (60% C.L.) in FITS @ Tj=70C:	594
Failure Rate (60% C.L.) in FITS @ Tj=55C:	201
Failure Rate (60% C.L.) in FITS @ Tj=25C:	17
Failure Analysis:	F/A(2)-Std by current

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCR5064, XCR3(5)128, XCR22(L)V10, XCR3(5)032
Package Type: PLCC44, 84, 28
Actual Temperature: 150C
Actual Voltage: 3.6V & 5.5V
Assumed Activation Energy: 0.7 ev @ C.L. = 60%

	XCR5064	XCR3(5)128	XCR22(L)V10	XCR3(5)032	XCRXXXX
Combined Lots:	2	2	1	4	9
Failures:	1	2	0	0	3
Device on test:	150	172	154	306	782
Actual device hours:	149,168	133,072	154,000	306,000	779,726
Mean :	994	774	1,000	1,000	997
Equivalent device hours @ Tj=70C:	16,393,549	11,687,534	13,525,612	26,875,566	68,482,280
Equivalent device hours @ Tj=55C:	48,373,242	34,486,974	39,910,680	79,303,039	202,073,992
Equivalent device hours @ Tj=25C:	5.84E+08	4.16E+08	4.82E+08	9.57E+08	2.44E+09
Failure Rate (60% C.L.) in FITS @ Tj=70C:	123	265	68	34	61
Failure Rate (60% C.L.) in FITS @ Tj=55C:	42	90	23	12	21
Failure Rate (60% C.L.) in FITS @ Tj=25C:	3	7	2	1	2
Failure Analysis:	F/A(1)-Gate oxide defect	F/A(2)-1-Idd failure, 1-single bit charge loss			

Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCR3960
Package Type: BGA492, PC84
Test Condition: T = 133C, R.H. = 85%,
Bias Voltage: 3.6V, 5.5V

	XCR3960	XCR3(5)128
Combined Started Lot:	3	1
Combined Completed Lots:	3	1
Failures:	0	1
Device on test:	105	77
Mean Test Hours/Device:	96	96
Total Device Hours:	10,080	7,392
Failure Analysis:		1F- single bit charge loss

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCR3960, XCR5064
Package Type: BGA492, TQ44
Test Condition: T = -55C/+125C (Air to Air)

	XCR3960	XCR5064
Combined Started Lot:	3	2
Combined Completed Lots:	3	2
Failures:	0	0
Device on test:	89	154
Mean Test Cycles/Device:	1,000	1,000
Total Device Cycles:	89,000	154,000
Failure Analysis:		

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCR5128, XCR3(5)064, XCR22(L)V10
Package Type: TQ100, LQ128, PQ100, PC-28, 44, 84
Test Condition: T = -65C/+150C (Air to Air)

	XCR3(5)128	XCR3(5)064	XCR22(L)V10
Combined Started Lot:	7	3	1
Combined Completed Lots:	7	3	1
Failures:	1	0	0
Device on test:	614	231	152
Mean Test Cycles/Device:	475	1,000	500
Total Device Cycles:	291,600	231,000	76,000
Failure Analysis:	F/A(1)-Single bit charge loss		

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCR3960,5064,3(5)128,3(5)032
Package Type: BGA492, TQ44, PC44,84, PQ100, TQ100, LQ128, CP56
Test Condition: T = 121C; 15 PSIG (unbiased)

	XCR3960	XCR3(5)064	XCR3(5)128	XCR3(5)032
Combined Started Lot:	3	8	7	3
Combined Completed Lots:	3	8	7	3
Failures:	4	0	0	0
Device on test:	101	610	607	231
Mean Test Hour s/Device:	166	211	123	168
Total Device Hours:	16,752	128,688	74,760	38,808
Failure Analysis Number:	F/A(3)2-pkg warp 2-Stdby current			

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XCR3(5)032 Microcircuit Group**
Package Type:	**PC44**
Test Condition:	**T = 85C, R.H. = 85%**
Bias Voltages:	**3.0V & 5.0V**

	XC3(5)032
Combined Started Lot:	**3**
Combined Completed Lots:	**3**
Failures:	**0**
Device on test:	**230**
Mean Test Hour s/Device:	**1,000**
Total Device Hours:	**230,000**
Failure Analysis Number:	

Reliability Testing Summary-Packages
Erase Cycling
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XCR3(5)128**
Package Type:	**PLCC- 84**
Test Condition:	**25C**
Voltage:	**Vcc=5.0V, Vpp=12.0-12.5V**

	XCR3(5)128
Combined Started Lot:	**1**
Combined Completed Lots:	**1**
Failures:	**0**
Device on test:	**10**
Mean Test Cycles/Device:	**1,000**
Total Device Cycles:	**10,000**

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Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XC17XXXD, XC17XXXE, XC17XXXL
Package Type:	Various
Actual Temperature:	145C
Actual Voltage:	5.7V +/-0.25, 3.3V+/-0.3V
Assumed Activation Energy:	0.58 ev for Eprom

	XC17XXXD	XC17XXXE	XC17XX	XC17XXL
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Lots:	2	2	1	5
Failures:	0	1	0	2
Device on test:	123	214	74	411
Actual device hours:	166,768	370,607	150,072	595,285
Mean :	1,356	1,732	2,028	1,448
Equivalent device hours @ Tj=125C:	374,332	831,875	336,856	1,336,194
Equivalent device hours @ Tj=55C:	13,782,459	30,628,633	12,402,627	49,197,036
Equivalent device hours @ Tj=25C:	1.09E+08	2.41E+08	9.77E+07	3.87E+08
Failure Rate (60% C.L.) in FITS @ Tj=55C:	66	66	74	63
Failure Rate (60% C.L.) in FITS @ Tj=25C:	8	8	9	8

Failure Analysis:

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XC17SXX, XC17SXXXL, XC95XXX, XC95XXXXL
Package Type:	Various
Actual Temperature:	145C
Actual Voltage:	5.7V +/-0.25, 3.3V+/-0.3V
Assumed Activation Energy:	0.58 ev for Eprom; 0.7 e.v. for XC95XXX

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC17SXX	XC17SXXXL	XC95XXX	XC95XXXXL
Combined Lots:	4	5	18	4
Failures:	3	3	0	1
Device on test:	337	444	1,322	303
Actual device hours:	518,906	628,046	1,407,118	410,009
Mean :	1,540	1,415	1,064	1,353
Equivalent device hours @ Tj=125C:	1,164,752	1,409,731	3,733,583	1,087,899
Equivalent device hours @ Tj=55C:	42,884,731	51,904,553	289,874,146	84,464,138
Equivalent device hours @ Tj=25C:	3.38E+08	4.09E+08	3.50E+09	1.02E+09
Failure Rate (60% C.L.) in FITS @ Tj=55C:	97	80	3	24
Failure Rate (60% C.L.) in FITS @ Tj=25C:	12	10	0.3	2

Failure Analysis:

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XC17XXXD Microcircuit Group
Package Type:	DD8, PLCC-20
Actual Temperature:	145C +8C/-0C
Actual Voltage:	5.7V +/-0.25V
Assumed Activation Energy:	0.58 ev @ C.L. = 60%

	XC17256D	XC17XXXD
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Lots:	2	2
Failures:	0	0
Device on test:	123	123
Actual device hours:	166,768	166,768
Mean :	1,356	1,356
Equivalent device hours @ Tj=125C:	374,332	374,332
Equivalent device hours @ Tj=55C:	13,782,459	13,782,459
Equivalent device hours @ Tj=25C:	1.09E+08	1.09E+08
Failure Analysis:		
Failure Rate (60% C.L.) in FITS @ Tj=55C:		66
Failure Rate (60% C.L.) in FITS @ Tj=25C:		8

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XC17XX Microcircuit Group
Package Type:	PD8
Actual Temperature:	145C +8C/-0C
Actual Voltage:	5.7+/-0.25V
Assumed Activation Energy:	0.58 ev @ C.L. = 60%

	XC1701	XC17XX
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Lots:	1	1
Failures:	0	0
Device on test:	74	74
Actual device hours:	150,072	150,072
Mean :	2,028	2,028
Equivalent device hours @ Tj=125C:	336,856	336,856
Equivalent device hours @ Tj=55C:	12,402,627	12,402,627
Equivalent device hours @ Tj=25C:	9.77E+07	9.77E+07

Failure Analysis:

Failure Rate (60% C.L.) in FITS @ Tj=55C: 74
Failure Rate (60% C.L.) in FITS @ Tj=25C: 9

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XC17XXL Microcircuit Group
Package Type:	PD8, VQFP-44, CC-44
Actual Temperature:	145C +8C/-0C
Actual Voltage:	3.3V +/-0.3V
Assumed Activation Energy:	0.58 ev @ C.L. = 60%

	XC1701L	XC1704L	XC17XXL
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Lots:	5	1	6
Failures:	2	0	2
Device on test:	382	76	458
Actual device hours:	491,873	115,444	607,317
Mean :	1,288	1,519	1,326
Equivalent device hours @ Tj=125C:	1,104,073	259,129	1,363,202
Equivalent device hours @ Tj=55C:	40,650,602	9,540,813	50,191,415
Equivalent device hours @ Tj=25C:	3.20E+08	7.51E+07	3.95E+08
Failure Analysis:	F/A 98117(1)-MARG F/A 99111(1)-FANC		
Failure Rate (60% C.L.) in FITS @ Tj=55C:			62
Failure Rate (60% C.L.) in FITS @ Tj=25C:			8

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC17SXX Microcircuit Group**
Package Type:	**PD8, CC44**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**3.3V +/-0.3V,** ***5.7+/-0.25V**
Assumed Activation Energy:	**0.58 ev @ C.L. = 60%**

	XC17S30*	XC17S40	XC17SXX
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Lots:	1	3	4
Failures:	1	2	3
Device on test:	107	230	337
Actual device hours:	214,601	304,305	518,906
Mean :	2,006	1,323	1,540
Equivalent device hours @ Tj=125C:	481,700	683,052	1,164,752
Equivalent device hours @ Tj=55C:	17,735,594	25,149,137	42,884,731
Equivalent device hours @ Tj=25C:	1.40E+08	1.98E+08	3.38E+08
Failure Analysis:	F/A98133(1)-MARG	F/A 98117(1)-MARG F/A99111(1)-FANC	

Failure Rate (60% C.L.) in FITS @ Tj=55C: 97
Failure Rate (60% C.L.) in FITS @ Tj=25C: 12

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XC17SXL Microcircuit Group
Package Type:	PD8,CC44
Actual Temperature:	145C +8C/-0C
Actual Voltage:	3.3V +/-0.3V
	*5.7+/-0.25V
Assumed Activation Energy:	0.58 ev @ C.L. = 60%

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC17S10XL	XC17S30XL*	XC17S40XL	XC17SXXXL
Combined Started Lots:	1	1	3	5
Failures:	0	1	2	3
Device on test:	107	107	230	444
Actual device hours:	109,140	214,601	304,305	628,046
Mean :	1,020	2,006	1,323	1,415
Equivalent device hours @ Tj=125C:	244,979	481,700	304,305	1,409,731
Equivalent device hours @ Tj=55C:	9,019,822	17,735,594	25,149,137	51,904,553
Equivalent device hours @ Tj=25C:	7.10E+07	1.40E+08	1.98E+08	4.09E+08
Failure Analysis:		F/A98133(1)-MARG	F/A 98117(1)-MARG F/A99111(1)-FANC	

Failure Rate (60% C.L.) in FITS @ Tj=55C: 80
Failure Rate (60% C.L.) in FITS @ Tj=25C: 10

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	Si Gate CMOS
Device Type:	XC17XXXE Microcircuit Group
Package Type:	PD8
Actual Temperature:	145C +8C/-0C
Actual Voltage:	5.7V +/-0.25V
Assumed Activation Energy:	0.58 ev @ C.L. = 60%

	XC17256E	XC17XXXE
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Lots:	2	2
Failures:	1	1
Device on test:	214	214
Actual device hours:	370,607	370,607
Mean :	1,732	1,732
Equivalent device hours @ Tj=125C:	831,875	831,875
Equivalent device hours @ Tj=55C:	30,628,633	30,628,633
Equivalent device hours @ Tj=25C:	2.41E+08	2.41E+08
Failure Analysis:	F/A98133(1)-MARG	
Failure Rate (60% C.L.) in FITS @ Tj=55C:		66
Failure Rate (60% C.L.) in FITS @ Tj=25C:		8

Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor

Technology:	Si Gate CMOS
Device Type:	XC95XXX Microcircuit Group
Package Type:	PLCC-44 & 84 & PQFP-160, HQFP-208
Actual Temperature:	145C +8C/-0C
Actual Voltage:	5.7V +/-0.25V
Assumed Activation Energy:	0.7 ev @ C.L. = 60%

	XC95108	XC95144	XC9536	XC9572
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Lots:	3	3	4	6
Failures:	0	0	0	0
Device on test:	259	232	310	367
Actual device hours:	187,149	203,709	398,296	452,754
Mean :	723	878	1,285	1,234
Equivalent device hours @ Tj=125C:	496,573	540,512	1,056,821	1,201,317
Equivalent device hours @ Tj=55C:	38,553,736	41,965,189	82,051,195	93,269,846
Equivalent device hours @ Tj=25C:	4.65E+08	5.07E+08	9.90E+08	1.13E+09

Failure Analysis:

Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor

Technology:	Si Gate CMOS
Device Type:	XC95XXX Microcircuit Group
Package Type:	PLCC-44 & 84 & PQFP-160, HQFP-208
Actual Temperature:	145C +8C/-0C
Actual Voltage:	5.7V +/-0.25V
Assumed Activation Energy:	0.7 ev @ C.L. = 60%

	XC95288	XC95216	XC95XXX
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Lots:	1	1	18
Failures:	0	0	0
Device on test:	76	78	1,322
Actual device hours:	76,836	88,374	1,407,118
Mean :	1,011	1,133	1,064
Equivalent device hours @ Tj=125C:	203,873	234,488	3,733,583
Equivalent device hours @ Tj=55C:	15,828,644	18,205,536	289,874,146
Equivalent device hours @ Tj=25C:	1.91E+08	2.20E+08	3.50E+09
Failure Analysis:			

Failure Rate (60% C.L.) in FITS @ Tj=55C:	3
Failure Rate (60% C.L.) in FITS @ Tj=25C:	0.3

Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor

Technology:	Si Gate CMOS
Device Type:	XC95XXX Microcircuit Group
Package Type:	PQFP-160
Actual Temperature:	145C +8C/-0C
Actual Voltage:	3.3V +/-0.3V
Assumed Activation Energy:	0.7 ev @ C.L. = 60%

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC9536XL	XC95144XL	XC95288XL	XC95XXXL
Combined Lots:	1	2	1	4
Failures:	0	0	1	1
Device on test:	76	151	76	303
Actual device hours:	233,016	111,253	65,740	410,009
Mean :	3,066	737	865	1,353
Equivalent device hours @ Tj=125C:	618,274	295,194	174,432	1,087,899
Equivalent device hours @ Tj=55C:	48,002,594	22,918,738	13,542,806	84,464,138
Equivalent device hours @ Tj=25C:	5.79E+08	2.77E+08	1.63E+08	1.02E+09
Failure Analysis:			F/A99237(1)-FANC	

Failure Rate (60% C.L.) in FITS @ Tj=55C:	24
Failure Rate (60% C.L.) in FITS @ Tj=25C:	2

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XXXD, XC17XX/L, XC17SXX, XC17XXXE
Package Type: T=85C, R.H.=85%
Test Condition: 5.0V +/- .25V
Bias Voltages:

	XC17XXXD	XC17XX/L	XC17SXX	XC17XXE
Period:	Oct. 1, 1997 to Oct. 1, 1999			
Combined Started Lot:	1	2	3	1
Combined Completed Lots:	1	2	3	1
Failures:	0	0	0	0
Device on test:	45	152	166	45
Mean Test Hour s/Device:	1,008	1,024	1,008	1,024
Total Device Hours:	45,360	155,648	167,260	46,080

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC95XXX, XC95XXXXL
Package Type: Various
Test Condition: T=85C, R.H.=85%
Bias Voltages: 5.0V +/- .25V

	XC95XXX	XC95XXXXL
Period:	Oct. 1, 1997 to Oct. 1, 1999	
Combined Started Lot:	8	1
Combined Completed Lots:	8	1
Failures:	0	0
Device on test:	512	76
Mean Test Hour s/Device:	1,076	1,139
Total Device Hours:	551,067	86,564

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XXXD Microcircuit Group
Package Type: SOIC-8
Test Condition: T = 85C, R.H. = 85%
Bias Voltages: 5.0V +/- .25V

	XC1765D	XC17XXXD
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	45	45
Mean Test Hour s/Device:	1,008	1,008
Total Device Hours:	45,360	45,360

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XX/L Microcircuit Group
Package Type: SOIC-20, VQFP-44
Test Condition: T = 85C, R.H. = 85%
Bias Voltages: 5.0V +/- .25V

	XC1701L	XC1702L	XC17XX/L
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	1	1	2
Combined Completed Lots:	1	1	2
Failures:	0	0	0
Device on test:	76	76	152
Mean Test Hour s/Device:	1,000	1,048	1,024
Total Device Hours:	76,000	79,648	155,648

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XXXE Microcircuit Group
Package Type: VOIC-8
Test Condition: T = 85C, R.H. = 85%
Bias Voltages: 5.0V +/- .25V

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC17256E	XC17XXXE
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	45	45
Mean Test Hour s/Device:	1,024	1,024
Total Device Hours:	46,080	46,080

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17SXX Microcircuit Group
Package Type: SOIC-20, VOIC-8
Test Condition: T = 85C, R.H. = 85%
Bias Voltages: 5.0V +/- .25V

	XC17S20	XC17S30	XC17S40	XC17SXX
Period:	Oct. 1, 1997 to Oct. 1, 1999			
Combined Started Lot:	1	1	1	3
Combined Completed Lots:	1	1	1	3
Failures:	0	0	0	0
Device on test:	45	45	76	166
Mean Test Hour s/Device:	1,004	1,024	1,000	1,008
Total Device Hours:	45,180	46,080	76,000	167,260

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC95XXX Microcircuit Group
Package Type: PQFP-160, VQFP-44, CS-48, 144
Test Condition: T = 85C, R.H. = 85%
Bias Voltages: 5.0V +/- .25V

	XC95144	XC9536	XC95216	XC95XXX
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Started Lot:	2	5	1	8
Combined Completed Lots:	2	5	1	8
Failures:	0	0	0	0
Device on test:	151	316	45	512
Mean Test Hour s/Device:	1,068	1,068	1,163	1,076
Total Device Hours:	161,275	337,457	52,335	551,067
Failure Analysis Number:				

Reliability Testing Summary-Packages
Bias Moisture Life
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC95XXXXL Microcircuit Group
Package Type: PQFP-160
Test Condition: T = 85C, R.H. = 85%
Bias Voltages: 3.3V +/- .3V

	XC95144XL	XC95XXXXL
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	76	76
Mean Test Hour s/Device:	1,139	1,139
Total Device Hours:	86,564	86,564
Failure Analysis Number:		

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XXX, XC17XXL, XC17XXE, XC17SXX, XC95XXX
Package Type: Various
Test Condition: T=121C; 2 atm. sat. steam

	XC17XX	XC17XXL	XC17XXE	XC17SXX	XC95XXX
Period:	Jan. 1, 1998 to Jan. 1, 2000				
Combined Started Lot:	1	1	2	4	10
Combined Completed Lots:	1	1	2	4	10
Failures:	0	0	0	0	0
Device on test:	75	76	89	210	577
Mean Test Hour s/Device:	96	168	140	160	128
Total Device Hours:	72,000	12,768	12,504	33,642	73,632

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XX Microcircuit Group
Package Type: SOIC-20
Test Condition: T = 121C; 2 atm. sat. steam

	XC1701	XC17XX
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	75	75
Mean Test Hour s/Device:	96	96
Total Device Hours:	72,000	72,000
Failure Analysis Number:		

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XX/L Microcircuit Group
Package Type: SOIC-20
Test Condition: T = 121C; 2 atm. sat. steam

	XC1701L	XC17XXL
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	76	76
Mean Test Hour s/Device:	168	168
Total Device Hours:	12,768	12,768
Failure Analysis Number:		

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XXXE Microcircuit Group
Package Type: PLCC-20, VOIC-8
Test Condition: T = 121C; 2 atm. sat. steam

	XC17256E	XC17XXXE
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	2	2
Combined Completed Lots:	2	2
Failures:	0	0
Device on test:	89	89
Mean Test Hour s/Device:	140	140
Total Device Hours:	12,504	12,504
Failure Analysis Number:		

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17SXX Microcircuit Group
Package Type: SOIC-20, PLCC-20, VOIC-8
Test Condition: T = 121C; 2 atm. sat. steam

	XC17S20	XC17S30	XC17S40	XC17SXX
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Started Lot:	1	2	1	4
Combined Completed Lots:	1	2	1	4
Failures:	0	0	0	0
Device on test:	45	89	76	210
Mean Test Hour s/Device:	186	140	168	160
Total Device Hours:	8,370	12,504	12,768	33,642
Failure Analysis Number:				

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC95XXX Microcircuit Group
Package Type: PLCC-44, CS-48, 144, VQFP-44
Test Condition: T = 121C; 2 atm. sat. steam

	XC9536	XC9572	XC95144	XC95216	XC95XXX
Period:	Jan. 1, 1998 to Jan. 1, 2000				
Combined Started Lot:	3	5	1	1	10
Combined Completed Lots:	3	5	1	1	10
Failures:	0	0	0	0	0
Device on test:	193	263	76	45	577
Mean Test Hour s/Device:	124	124	168	96	128
Total Device Hours:	24,000	32,544	12,768	4,320	73,632
Failure Analysis Number:					

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XXXD, XC17XX, XC17XXL, XC17XXXE
Package Type: Various
Test Condition: T = -65C / +150C (Air to Air)
T = -55C / +125C (Air to Air) for BGA

	XC17XXXD	XC17XX	XC17XXL	XC17XXXE
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Started Lot:	1	3	2	2
Combined Completed Lots:	1	3	2	2
Failures:	0	1	0	0
Device on test:	76	166	149	90
Mean Test Cycles/Device:	1,004	1,035	947	1,071
Total Device Cycles:	76,304	171,840	141,083	96,345
Failure Analysis Number:				

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17SXX, XC95XXX & XC95XXXXL
Package Type: Various
Test Condition: T = -65C / +150C (Air to Air)
T = -55C / +125C (Air to Air) for BGA

	XC17SXX	XC95XXX	XC95XXXXL
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	4	19	1
Combined Completed Lots:	4	19	1
Failures:	0	0	0
Device on test:	211	886	76
Mean Test Cycles/Device:	991	906	1,289
Total Device Cycles:	209,103	802,814	97,964
Failure Analysis Number:			

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XXXD Microcircuit Group
Package Type: PD-8, 20, SOIC-8, VO-8
Test Condition: T = -65C/+150C (Air to Air)

	XC17256D	XC17XXXD
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	76	76
Mean Test Cycles/Device:	1,004	1,004
Total Device Cycles:	76,304	76,304
Failure Analysis Number:		

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC17XXL Microcircuit Group**
Package Type:	**PD-8, SOIC-20, PLCC-20**
Test Condition:	**T = -65C/+150C (Air to Air)**

	XC1701	XC17XX
Period:	**Jan. 1, 1998 to Jan. 1, 2000**	
Combined Started Lot:	3	3
Combined Completed Lots:	3	3
Failures:	1	1
Device on test:	166	166
Mean Test Cycles/Device:	1,035	1,035
Total Device Cycles:	171,840	171,840
Failure Analysis Number:	F/A98110(1)-FANC	

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XXL Microcircuit Group
Package Type: SOIC-20, VQFP-44
Test Condition: T = -65C/+150C (Air to Air)

	XC1701L	XC1702L	XC17XXL
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	1	1	2
Combined Completed Lots:	1	1	2
Failures:	0	0	0
Device on test:	76	73	149
Mean Test Cycles/Device:	843	1,055	947
Total Device Cycles:	64,068	77,015	141,083
Failure Analysis Number:			

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XXXE Microcircuit Group
Package Type: PLCC-20, VOIC-8
Test Condition: T = -65C/+150C (Air to Air)

	XC17256E	XC17XXXE
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	2	2
Combined Completed Lots:	2	2
Failures:	0	0
Device on test:	90	90
Mean Test Cycles/Device:	1,071	1,071
Total Device Cycles:	96,345	96,345
Failure Analysis Number:		

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17SXX Microcircuit Group
Package Type: SOIC-20, PLCC-20, VOIC-8
Test Condition: T = -65C/+150C (Air to Air)

	XC17S20	XC17S30	XC17S40	XC17SXX
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Started Lot:	1	2	1	4
Combined Completed Lots:	1	2	1	4
Failures:	0	0	0	0
Device on test:	45	90	76	211
Mean Test Cycles/Device:	1,082	1,071	843	991
Total Device Cycles:	48,690	96,345	64,068	209,103
Failure Analysis Number:				

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC95XXX Microcircuit Group
Package Type: PQFP-160, PLCC-44, 84, CS-48, 144, VQFP-44
Test Condition: T = -65C/+150C (Air to Air)
T = -55C / +125C (Air to Air) for CS*

	XC95108	XC9536*	XC9536	XC95216
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Started Lot:	2	4	2	1
Combined Completed Lots:	2	4	2	1
Failures:	0	0	0	0
Device on test:	81	133	90	45
Mean Test Cycles/Device:	1,009	932	1,015	546
Total Device Cycles:	81,729	124,000	91,350	24,570
Failure Analysis Number:				

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC95XXX Microcircuit Group**
Package Type:	**PQFP-160, PLCC-44, 84, CS-48, 144, VQFP-44**
Test Condition:	**T = -65C/+150C (Air to Air)**
	T = -55C / +125C (Air to Air) for CS*

	XC9572	XC95144	XC95144*	XC95XXX
Period:	**Jan. 1, 1998 to Jan. 1, 2000**			
Combined Started Lot:	8	1	1	19
Combined Completed Lots:	8	1	1	19
Failures:	0	0	0	0
Device on test:	388	73	76	886
Mean Test Cycles/Device:	834	1,105	1,011	906
Total Device Cycles:	323,664	80,665	76,836	802,814
Failure Analysis Number:				

Reliability Testing Summary-Packages
Temperature Cycle (Air to Air)
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC95XXX Microcircuit Group
Package Type: PQFP-160
Test Condition: T = -65C/+150C (Air to Air)

	XC95144XL	XC95XXXXL
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	76	76
Mean Test Cycles/Device:	1,289	1,289
Total Device Cycles:	97,964	97,964
Failure Analysis Number:		

Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XXXE, XCS17XX, XC95XXX Microcircuit Group
Package Type: Various
Test Condition: T = 130C, R.H. = 85%, 3ATM
Bias Voltage: 5.0V +/- .25V

	XC1700E	XCS17XX	XC95XXX
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	1	1	5
Combined Completed Lots:	1	1	5
Failures:	0	0	0
Device on test:	35	35	119
Mean Test Hours/Device:	500	500	276
Total Device Hours:	17,500	17,500	32,800

Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XXXE Microcircuit Group
Package Type: PLCC-20
Test Condition: T = 130C, R.H. = 85%, 3ATM
Bias Voltage: 5.0V +/- .25V

	XC17256E	XC17XXXE
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	35	35
Mean Test Hours/Device:	500	500
Total Device Hours:	17,500	17,500

Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XCS17XX Microcircuit Group**
Package Type:	**PLCC-20**
Test Condition:	**T = 130C, R.H. = 85%, 3ATM**
Bias Voltage:	**5.0V +/- .25V**

	XC17S30	**XCS17XX**
Period:	**Jan. 1, 1998 to Jan. 1, 2000**	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	35	35
Mean Test Hours/Device:	500	500
Total Device Hours:	17,500	17,500

Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC95XXX
Package Type: PQFP-160, PLCC-44
Test Condition: T = 130C, R.H. = 85%, 3ATM
Bias Voltage: 5.0V +/- .25V

	XC9572	XC95216	XC95XXX
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	4	1	5
Combined Completed Lots:	4	1	5
Failures:	0	0	0
Device on test:	104	15	119
Mean Test Hours/Device:	243	500	276
Total Device Hours:	25,300	7,500	32,800

Reliability Testing Summary-Packages
Data Retention
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XXXE, XC17XXL, XC17SXX, XC17SXXXL
Microcircuit Group
Package Type: Various
Test Condition: 150C

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC17XXXE	XC17XXL	XC17SXX	XC17SXXXL
Combined Started Lot:	2	4	2	1
Combined Completed Lots:	2	4	2	1
Failures:	0	0	0	0
Device on test:	285	304	276	138
Mean Test Hours/Device:	2,100	2,017	2,092	2,171
Total Device Hours:	598,518	613,128	577,253	299,598
Failure Analysis Number:				

Reliability Testing Summary-Packages
Data Retention
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC95XXX, XC95XXXXL Microcircuit Group
Package Type: Various
Test Condition: 150C

	XC95XXX	XC95XXXXL
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	6	1
Combined Completed Lots:	6	1
Failures:	0	0
Device on test:	578	22
Mean Test Hours/Device:	2,242	2,130
Total Device Hours:	1,296,129	46,860
Failure Analysis Number:		

Reliability Testing Summary-Packages
Data Retention
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XXXE Microcircuit Group
Package Type: PD-8
Test Condition: 150C

	XC17256E	XC17XXXE
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	2	2
Combined Completed Lots:	2	2
Failures:	0	0
Device on test:	285	285
Mean Test Hours/Device:	2,100	2,100
Total Device Hours:	598,518	598,518

Reliability Testing Summary-Packages
Data Retention
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XXL Microcircuit Group
Package Type: PD-8
Test Condition: 150C

	XC1701L	XC1704L	XC17XXL
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	3	1	4
Combined Completed Lots:	3	1	4
Failures:	0	0	0
Device on test:	229	75	304
Mean Test Hours/Device:	2,019	2,009	2,017
Total Device Hours:	462,453	150,675	613,128

Reliability Testing Summary-Packages
Data Retention
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17SXX Microcircuit Group
Package Type: PD-8
Test Condition: 150C

Period: Jan. 1, 1998 to Jan. 1, 2000

	XC17S30	XC17S40	XC17SXX
Combined Started Lot:	1	1	2
Combined Completed Lots:	1	1	2
Failures:	0	0	0
Device on test:	143	133	276
Mean Test Hours/Device:	2,118	2,063	2,092
Total Device Hours:	302,874	274,379	577,253

Reliability Testing Summary-Packages
Data Retention
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17SXXXL Microcircuit Group
Package Type: PD-8
Test Condition: 150C

	XC17S10XL	XC17SXXXL
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	138	138
Mean Test Hours/Device:	2,171	2,171
Total Device Hours:	299,598	299,598

Reliability Testing Summary-Packages
Data Retention
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC95XXX Microcircuit Group
Package Type: PLCC- 84, PQFP-160, HQFP-208
Test Condition: 150C

	XC95108	XC9572	XC95216	XC95XXX
Period:	Jan. 1, 1998 to Jan. 1, 2000			
Combined Started Lot:	3	2	1	6
Combined Completed Lots:	3	2	1	6
Failures:	0	0	0	0
Device on test:	259	214	105	578
Mean Test Hours/Device:	2,831	1,621	2,057	2,242
Total Device Hours:	733,357	346,787	215,985	1,296,129
Failure Analysis Number:				

Reliability Testing Summary-Packages
Data Retention
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC95XXXXL Microcircuit Group
Package Type: PQFP-160
Test Condition: 150C

	XC95144XL	XC95XXXXL
Period:	Jan. 1, 1998 to Jan. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	22	22
Mean Test Hours/Device:	2,130	2,130
Total Device Hours:	46,860	46,860
Failure Analysis Number:		

Reliability Testing Summary-Packages
Erase Cycling
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC95XXX Microcircuit Group
Package Type: PLCC- 84
Test Condition: 55C
Voltage: Vcc=5.0V, Vpp=12.0-12.5V

	XC9536	XC95108	XC95XXX
Period:	Jan. 1, 1998 to Jan. 1, 2000		
Combined Started Lot:	1	1	2
Combined Completed Lots:	1	1	2
Failures:	0	0	0
Device on test:	29	80	109
Mean Test Cycles/Device:	10,000	10,939	10,689
Total Device Cycles:	290,000	875,120	1,165,120

Package Qualification & Monitor Program

Reliability Testing Summary
Package Qualification / Monitor
PD-8

Device Type:	XC1736D, XC1701
Package Type:	PD8
Die Attach Material:	Silver Epoxy
Molding Compound:	Sumitomo 6300H & Shenitsu KMC-1805

Reliability Test	Combined No. Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	2	1*	120	850	101,955
Pressure Pot	1	0	45	96	4,320
Solderability	1	0	5		
Resistance to Solvents	1	0	3		
Lead Fatigue	1	0	6		
Physical Dimension	1	0	3		

*F/A98110(1)-FANC

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
Package Qualification / Monitor
SOIC

Device Type: XC1701/L, XC1765D
Package Type: SOIC-8, SOIC-20
Die Attach Material: Silver Epoxy
Molding Compound: EME6300H

Reliability Test	Combined No.Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	3	0	136	915	124,503
Pressure Pot	2	0	121	141	17,088
Solderability	1	0	3		
Lead Fatigue	2	0	8		
Physical Dimension	1	0	5		
Resistance to Solvents	1	0	3		
Bond Pull	1	0	3		
Adhesion to lead finish	1	0	3		
Die shear	1	0	3		

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
Package Qualification / Monitor
TSOP

Device Type: XC17S20, 17256E
Package Type: VO8
Die Attach Material: Silver Epoxy
Molding Compound: KMC 184-3

Reliability Test	Combined No.Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	2	0	90	1,082	97,335
Pressure Pot	2	0	89	186	16,554
Solderability	2	0	6		
Physical Dimension	3	0	15		
Resistance to Solvents	2	0	6		
Lead Fatigue	2	0	7		

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
Package Qualification / Monitor
PLCC

Device Type: XC3030/A,XC4005E, XC4010, XC9536
XC95108, XC9572, XC1701, XC17256E, XC17256D
Package Type: PLCC- 84, 44, 20
Die Attach Material: Silver Epoxy
Molding Compound: Sumitomo 6300H, MP8000

Reliability Test	Combined No. Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	18	0	957	967	924,999
Pressure Pot	13	0	733	111	81,456
Hast	9	0	241	250	60,200
Solderability	2	0	6		
Resistance to Solvents	4	0	12		
Lead Fatigue	3	0	9		
Physical Dimension	4	0	20		
Bond Pull	4	0	20		
Die Shear	1	0	5		

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
Package Qualification / Monitor
PQFP

Device Type: XC3042/A, XC9572, XC95216, XC95144/XL, XC5206, XC4013E XC4013XL,XC4020XL, XC4006, XC4013/E, XC4025E, XCS30, XCS40, XCS30XL, XCV300, XCV1000

Package Type: PQFP- 100, 160, 208 & 240

Die Attach Materal: Silver Epoxy

Molding Compound: Sumitomo 6300H, EME-7304LC, E7N36 & MP8000

Reliability Test	Combined No. Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	27	0	1,372	997	1,367,371
Pressure Pot	16	2**	783	135	106,440
Hast	9	0	134	233	31,200
Solderability	4	0	12		
Resistance to Solvents	5	0	15		
Bond Pull	3	0	15		
Lead Fatigue	4	0	12		
Physical Dimension	3	0	15		
Salt Atmosphere	2	0	30		

** FA98043(2)-MST

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
Package Qualification / Monitor
TQFP

Device Type: XC3190/A, XC4010L, 4005, XC4006E, XC5204, XCS30, XC4010XL, XCV100
Package Type: TQFP- 144 & 176
Die Attach Material: Silver Epoxy
Molding Compound: EME-7320, E7N32

Reliability Test	Combined No. Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	8	0	389	1,089	423,640
Pressure Pot	7	0	366	138	50,328
Solderability	3	0	9		
Resistance to Solvents	2	0	6		
Lead Fatigue	1	0	3		
Physical Dimension	2	0	10		
Bond Pull	2	0	10		

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
Package Qualification / Monitor
VQFP

Device Type: XC3030/A, XC4003E, XCS30, XCS30XL, XC9536, XC1702L, XC5202
Package Type: VQFP- 44, 100
Die Attach Material: Silver Epoxy
Molding Compound: EME-7320

Reliability Test	Combined No.Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	7	0	382	1,029	393,059
Pressure Pot	5	0	286	133	37,920
Resistance to Solvents	3	0	9		
Bond pull	1	0	5		
Lead Fatigue	3	0	9		
Physical Dimension	3	0	15		
Solderability	3	0	9		

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
Package Qualification / Monitor
HQFP

Device Type: XC4020E, XC4013/E, XC4028EX, XC4036XLA, XC4036XL, XC4062XL,XC4044XLA, XC4085XLA, XC4036XV, XC40150XV, XCV300, XCV1000,XCV800

Package Type: HQFP- 240 & 304

Die Attach Material: 84-1LMSR4

Molding Compound: Sumitomo 7304L

Reliability Test	Combined No.Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	20	1 **	895	1,064	952,207
Pressure Pot	7	0	286	113	32,280
Hast	8	0	124	271	33,600
Resistance to Solvents	2	0	6		
Lead Fatigue	1	0	3		
Physical Dimension	3	0	15		
Solderability	2	0	6		
Salt Atmosphere	4	0	60		
Bond Pull	3	0	15		

**F/A-99036(1)-FANC

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
Package Qualification / Monitor
PPGA

Device Type: XC3190/A
Package Type: PPGA-175
Die Attach Material: Silver Epoxy
Sealant Material: R4785

Reliability Test	Combined No.Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	1	0	45	1,060	47,700
Pressure Pot	1	0	45	96	4,320
Solderability	1	0	3		
Lead Fatigue	1	0	3		
Physical Dimension	1	0	5		
Bond Strength	1	0	5		
Die shear	1	0	5		

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
Package Qualification / Monitor
HTFP

Device Type: XC3090A, XC4010, XC4020XL
Package Type: HT-144, HT-208
Die Attach Material: Silver Epoxy
Molding Compound: 7320CR

Reliability Test	Combined No.Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	1	0	45	1,094	49,230
Pressure Pot	2	0	61	96	5,856
Resistance to Solvents	1	0	3		
Physical Dimension	1	0	5		
Lead Integrity	1	0	3		
Solderability	1	0	3		
Adhesion to lead finish	1	0	3		

Reliability Testing Summary
Package Qualification / Monitor
BGA

Device Type: XC4010/E, XC4013, XC4028EX, XC4036EX, XC4013XL XC4020XL,XC4036XL/XLA,XC4062XL/XLA, XCV800 XC40125XV, XC4052XL, XC4085XLA, XCV1000

Package Type: BGA-225, 256, 352, 432 & 560

Die Attach Material: Silver Epoxy

Test Condition: -55C/+125C for T/C

Reliability Test	Combined No.Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	24	0	849	932	791,392
Pressure Pot	20	1*	730	123	89,496
Resistance to Solvents	4	0	12		
Physical Dimension	4	0	20		
Ball Shear	5	0	21		
Bond Pull	4	0	16		
Die shear	2	0	6		
Salt Atmosphere	3	0	45		

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Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
Package Qualification / Monitor
CS

Device Type:	**XC9536, XC95144, XCV100, XCV1000, XCS40XL**
Package Type:	**CS-48, -144, -280**
Die Attach Material:	**Silver Epoxy**
Test Condition:	**-55C/+125C for T/C**

Reliability Test	Combined No.Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	7	0	312	991	309,106
Pressure Pot	5	0	327	143	46,800
Hast	1	0	27	148	4,000
Resistance to Solvents	3	0	20		
Physical Dimension	4	0	15		
Ball Shear	3	0	15		
Bond Pull	3	0			

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
Package Qualification / Monitor
FG

Device Type: XCV1000
Package Type: FG-256, 556, 676, 680
Die Attach Material: Silver Epoxy
Test Condition: -55C/+125C for T/C

Reliability Test	Combined No.Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	5	0	150	1,009	150,792
Pressure Pot	6	0	169	93	15,696
Hast	2	0	29	300	8,700
Resistance to Solvents	3	0	9		
Physical Dimension	2	0	10		
Ball Shear	2	0	10		
Bond Pull	2	0	8		

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
PGA Package Qualification / Monitor
PGA-84, -120, -132, -156, -175, -191, -223, -299, -411, -475, -559

Code	Test	Combined Sample	Failures	Mean Hrs/Cycles Per Device	Total Device Hours
B2	Resistance to Solvents	177	0		
B3	Solderability	153	0		
B5	Bond Strength	180	0		
D1	Physical Dimension	110	0		
D2	Lead Integrity	21	0		
	Seal				
D3	Thermal Shock	75	0	15	1,125
	Temperature Cycle			100	7,500
	Seal				
	Visual Examination				
	End-Point Elect. Parametrics				
D4	Mechanical Shock	90	0		
	Vibration, Var. Freq.				
	Constant Accel.				
	Seal				
	Visual Examination				
	End-Point Elec. Para.				
D5	Salt Atmosphere	75	0		
	Seal				
	Visual Examination				
D6	Internal Water-Vapor Content	15	0		
D7	Adhesion of lead finish	15	0		

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
CB Package Qualification / Monitor
CB-100, -164, -196, -228

Code	Test	Combined Sample	Failures	Mean Hrs/Cycles Per Device	Total Device Hours
B2	Resistance to Solvents	165	0		
B3	Solderability	147	0		
B5	Bond Strength	135	0		
D1	Physical Dimension	180	0		
D2	Lead Integrity	36	0		
	Seal				
D3	Thermal Shock	180	0	15	2,700
	Temperature Cycle			100	18,000
	Seal				
	Visual Examination				
	End-Point Elect.				
	Parametrics				
D4	Mechanical Shock	180	0		
	Vibration, Var. Freq.				
	Constant Accel.				
	Seal				
	Visual Examination				
	End-Point Elec. Para.				
D5	Salt Atmosphere	195	0		
	Seal				
	Visual Examination				
D6	Internal Water-Vapor Content	38	0		
D7	Adhesion of lead finish	36	0		

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
CQFP Package Qualification / Monitor
CQFP-100

Code	Test	Combined Sample	Failures	Mean Hrs/Cycles Per Device	Total Device Hours
B2	Resistance to Solvents	9	0		
B3	Solderability	12	0		
B5	Bond Strength	12	0		
D1	Physical Dimension	15	0		
D2	Lead Integrity	3	0		
	Seal		0		
D3	Thermal Shock	15	0	15	225
	Temperature Cycle			100	1,500
	Seal				
	Visual Examination				
	End-Point Elect.				
	Parametrics				
D4	Mechanical Shock	30	0		
	Vibration, Var. Freq.				
	Constant Accel.				
	Seal				
	Visual Examination				
	End-Point Elec. Para.				
D5	Salt Atmosphere	15	0		
	Seal				
	Visual Examination				
D6	Internal Water-Vapor Content	3	0		
D7	Adhesion of lead finish	3	0		
D8	Lead Torque	3	0		

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
DD8 Package Qualification / Monitor

Code	Test	Combined Sample	Failures	Mean Hrs/Cycles Per Device	Total Device Hours
B2	Resistance to Solvents	18	0		
B3	Solderability	25	0		
B5	Bond Strength	31	0		
D1	Physical Dimension	45	0		
D2	Lead Integrity	24	0		
	Seal				
D3	Thermal Shock	120	1*	15	1,800
	Temperature Cycle			100	12,000
	Seal				
	Visual Examination				
	End-Point Elect.				
	Parametrics				
D4	Mechanical Shock	120	1*		
	Vibration, Var. Freq.				
	Constant Accel.				
	Seal				
	Visual Examination				
	End-Point Elec. Para.				
D5	Salt Atmosphere	120	1*		
	Seal				
	Visual Examination				
D6	Internal Water-Vapor Content	12	0		
D7	Adhesion of lead finish	12	0		
D8	Lead Torque	15	0		

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Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
CC Package Qualification / Monitor

Code	Test	Combined Sample	Failures	Mean Hrs/Cycles Per Device	Total Device Hours
B2	Resistance to Solvents	9	0		
B3	Solderability	3	0		
B5	Bond Strength	4	0		
D1	Physical Dimension	15	0		
D2	Lead Integrity	3	0		
	Seal				
D3	Thermal Shock	15	0	15	225
	Temperature Cycle			100	1,500
	Seal				
	Visual Examination				
	End-Point Elect.				
	Parametrics				
D4	Mechanical Shock	15	0		
	Vibration, Var. Freq.				
	Constant Accel.				
	Seal				
	Visual Examination				
	End-Point Elec. Para.				
D5	Salt Atmosphere	15	0		
	Seal				
	Visual Examination				
D6	Internal Water-Vapor Content	3	0		
D7	Adhesion of lead finish	3	0		
D8	Lead Torque	5	0		

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
WC44 Package Qualification (EPLD)

Code	Test	Combined Sample	Failures
B2	Resistance to Solvents	4	0
B3	Solderability	44	0
B5	Bond Strength	45	0
D1	Physical Dimension	40	0
D2	Lead Integrity	90	0
	Seal		
D3	Thermal Shock	25	0
	Temperature Cycle		
	Seal		
	Visual Examination		
	End-Point Elect.		
	Parametrics		
D4	Mechanical Shock	25	0
	Vibration, Var. Freq.		
	Constant Accel.		
	Seal		
	Visual Examination		
	End-Point Elec. Para.		
D5	Salt Atmosphere	30	0
	Seal		
	Visual Examination		
D6	Internal Water-Vapor Content	6	0
D7	Adhesion of lead finish	30	0
D8	Lead Torque	5	0

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
WC68 Package Qualification (EPLD)

Code	Test	Combined Sample	Failures
B3	Solderability	22	0
D1	Physical Dimension	25	0
D2	Lead Integrity Seal (No Leads)	45	0
D3	Thermal Shock Temperature Cycle Seal Visual Examination End-Point Elect. Parametrics	26	0
D4	Mechanical Shock Vibration, Var. Freq. Constant Accel. Seal Visual Examination End-Point Elec. Para.	25	0
D8	Lead Torque	5	0

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
WC84 Package Qualification (EPLD)

Code	Test	Combined Sample	Failures
B2	Resistance to Solvents	4	0
B3	Solderability	60	0
B5	Bond Strength	30	0
D1	Physical Dimension	68	0
D2	Lead Integrity Seal (No Leads)	167	0
D3	Thermal Shock Temperature Cycle Seal Visual Examination End-Point Elect. Parametrics	130	0
D4	Mechanical Shock Vibration, Var. Freq. Constant Accel. Seal Visual Examination End-Point Elec. Para.	105	1
D5	Salt Atmosphere Seal Visual Examination	47	0
D6	Internal Water-Vapor Content	10	0
D7	Adhesion of lead finish	45	0
D8	Lead Torque	10	0

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
PG84 Package Qualification (EPLD)

Code	Test	Combined Sample	Failures
B3	Solderability	22	0
D1	Physical Dimension	25	0
D2	Lead Integrity	77	0
	Seal (No Leads)		
D3	Thermal Shock	25	0
	Temperature Cycle		
	Seal		
	Visual Examination		
	End-Point Elect.		
	Parametrics		
D4	Mechanical Shock	25	0
	Vibration, Var. Freq.		
	Constant Accel.		
	Seal		
	Visual Examination		
	End-Point Elec. Para.		
D5	Salt Atmosphere	15	0
	Seal		
	Visual Examination		
D6	Internal Water-Vapor Content	5	0
D7	Adhesion of lead finish	15	0
D8	Lead Torque	6	0

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary
PG144 Package Qualification (EPLD)

Code	Test	Combined Sample	Failures
B3	Solderability	22	0
B5	Bond Strenght	15	0
D1	Physical Dimension	25	0
D2	Lead Integrity	45	0
	Seal (No Leads)		
D3	Thermal Shock	25	0
	Temperature Cycle		
	Seal		
	Visual Examination		
	End-Point Elect.		
	Parametrics		
D4	Mechanical Shock	24	0
	Vibration, Var. Freq.		
	Constant Accel.		
	Seal		
	Visual Examination		
	End-Point Elec. Para.		
D5	Salt Atmosphere	15	0
	Seal		
	Visual Examination		
D6	Internal Water-Vapor Content	3	0
D7	Adhesion of lead finish	15	0

Period: Jan. 1st, 1998 to Jan. 1st, 2000

Reliability Testing Summary-Packages
EIAJ Temperature Soldering Heat Test

Technology:	**Si-Gate CMOS**
Device Type:	**XC17XXX Microcircuit Group**
Package Type:	**PD8, SO20, VO8, VQ44**
Assembly:	**AAPI**
Preconditionning Test Condition:	**T = 85C, R.H. = 85%**
Test Duration:	**240 hours**
Solder Heat Temp.:	**350 +/- 10 degrees C**
Test Duration:	**3 + 0.5/-0 seconds**

	XC17S20	XC17S40	XC17128E	XC1702L	XC17XXX
Period:	**Oct. 1, 1997 to Oct. 1, 1999**				
Combined Started Lot:	**1**	**1**	**1**	**1**	**4**
Combined Completed Lots:	**1**	**1**	**1**	**1**	**4**
Failures:	**0**	**0**	**0**	**0**	**0**
Device on test:	**3**	**3**	**3**	**3**	**12**
Failure Analysis:					

Note : Solderability test applied to all leads

Reliability Testing Summary-Packages
EIAJ Temperature Soldering Heat Test

Technology:	Si-Gate CMOS
Device Type:	XC3XXX/A Microcircuit Group
Package Type:	PLCC-44, VQFP-100
Assembly:	Anam
Preconditionning Test Condition:	T = 85C, R.H. = 85%
Test Duration:	240 hours
Solder Heat Temp.:	350 +/- 10 degrees C
Test Duration:	3 + 0.5/-0 seconds

	XC3030/A	XC3042/A	XC3XXX/A
Period:	Oct. 1, 1997 to Oct. 1, 1999		
Combined Started Lot:	1	1	2
Combined Completed Lots:	1	1	2
Failures:	0	0	0
Device on test:	3	3	6
Failure Analysis:			

Note : Solderability test applied to all leads

Reliability Testing Summary-Packages
EIAJ Temperature Soldering Heat Test

Technology:	**Si-Gate CMOS**
Device Type:	**XC4XXXE, XC4XXXXL, XC4XXXXLA Microcircuit Group**
Package Type:	**PLCC- 84, PQFP-240, HQFP160, 304, HT-144**
Assembly:	**Anam**
Preconditionning Test Condition:	**T = 85C, R.H. = 85%**
Test Duration:	**240 hours**
Solder Heat Temp.:	**350 +/- 10 degrees C**
Test Duration:	**3 + 0.5/-0 seconds**

	XC4003E	XC4013E	XC4085XLA	XC4013XL	XC4044XL	XC4XXX
Period:	Oct. 1, 1997 to Oct. 1, 1999					
Combined Started Lot:	1	1	1	1	1	5
Combined Completed Lots:	1	1	1	1	1	5
Failures:	0	0	0	0	0	0
Device on test:	3	3	3	3	3	15
Failure Analysis:						

Note : Solderability test applied to all leads

Reliability Testing Summary-Packages
EIAJ Temperature Soldering Heat Test

Technology:	Si-Gate CMOS
Device Type:	XC5XXX Microcircuit Group
Package Type:	TQFP-176
Assembly:	Anam
Preconditionning Test Condition:	T = 85C, R.H. = 85%
Test Duration:	240 hours
Solder Heat Temp.:	350 +/- 10 degrees C
Test Duration:	3 + 0.5/-0 seconds

	XC5206	XC5XXX
Period:	Oct. 1, 1997 to Oct. 1, 1999	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	3	3
Failure Analysis:		

Note : Solderability test applied to all leads

Reliability Testing Summary-Packages
EIAJ Temperature Soldering Test

Technology:	Si-Gate CMOS
Device Type:	XC17XXX Microcircuit Group
Package Type:	DD8, PLCC-20
Assembly:	AAPI
Preconditionning Test Condition:	Steam Age
Test Duration:	1 hour min.
Solder Heat Temp.:	230 +/- 5 degrees C
Test Duration:	3 +/- 1 seconds
Rate:	1 +/- 0.1 in./sec.

	XC 17256D	XC17XXX
Period:	Oct. 1, 1997 to Oct. 1, 1999	
Combined Started Lot:	2	2
Combined Completed Lots:	2	2
Failures:	0	0
Device on test:	8	8
Failure Analysis:		

Note : Solderability test applied to the number of leads LTPD 10, 22 leads accept on 0

Reliability Testing Summary-Packages
EIAJ Temperature Soldering Test

Technology: Si-Gate CMOS
Device Type: XC4XXX Microcircuit Group
Package Type: PQ-160,240, VQFP-100, HQFP-304
Assembly: Anam
Preconditionning Test Condition: Steam Age
Test Duration: 1 hour min.
Solder Heat Temp.: 230 +/- 5 degrees C
Test Duration: 3 +/-1 seconds
Rate: 1 +/- 0.1 in.sec

	XC4005XL	XC4044XL	XC4013XLA	XC4XXX
Period:	Oct. 1, 1997 to Oct. 1, 1999			
Combined Started Lot:	1	1	2	4
Combined Completed Lots:	1	1	2	4
Failures:	0	0	0	0
Device on test:	4	3	7	14
Failure Analysis:				

Note : Solderability test applied to the number of leads LTPD 10, 22 leads accept on 0

Reliability Testing Summary-Packages
Low Temperature Soldering Heat Test

Technology:	**Si-Gate CMOS**
Device Type:	**XC17XXX Microcircuit Group**
Package Type:	**PLCC-20, DD-8**
Steam Age:	**2 hours**
Flux:	**RMA**
Solder Heat Temp.:	**215 +/- 5 degrees C**

	XC17256D	XC17XXX
Period:	**Oct. 1, 1997 to Oct. 1, 1999**	
Combined Started Lot:	2	2
Combined Completed Lots:	2	2
Failures:	0	0
Device on test:	8	8
Failure Analysis:		

Note : Solderability test applied to the number of leads LTPD 10, 22 leads accept on 0

Reliability Testing Summary-Packages
Low Temperature Soldering Heat Test

Technology:	**Si-Gate CMOS**
Device Type:	**XC4XXX Microcircuits Group**
Package Type:	**PQFP-160,240, PLCC-84, HQFP-304, VQFP-100**
Steam Age:	**2 hours**
Flux:	**RMA**
Solder Heat Temp.:	**215 +/- 5 degrees C**

	XC4005XL	XC4044XL	XC4013XLA	XC4XXX
Period:	**Oct. 1, 1997 to Oct. 1, 1999**			
Combined Started Lot:	**2**	**1**	**2**	**5**
Combined Completed Lots:	**2**	**1**	**2**	**5**
Failures:	**0**	**0**	**0**	**0**
Device on test:	**7**	**3**	**6**	**16**
Failure Analysis:				

Note : Solderability test applied to the number of leads LTPD 10, 22 leads accept on 0