The Reliability Data Program

Expanded Version

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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.

2.4.2Hermetic 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.

2.5.1Process 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).

2.5.2Assembly 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,XC18VXX, Flash XC95XXX, XC95XXXXL, CoolRunner (XCRXXXX) and LCA (Logic Cell Array); XC4XXX/E, XC4XXXEX, XC4XXXXL, XC4XXXXLA, XCSXX, XC4XXXXV, XCVXXXX, XCVXXXE, XC5XXX, XC2SXXX. 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	EPROM XC18VXX	LCA XC4XXX/E	LCA XC4XXX/EX	LCA XC4XXXXL	LCA XC4XXXXLA	LCA XC4XXXXV
XC1718D XC1736D XC1765D XC17128D XC17256D XC1701 XC1702 XC1704 XC1765E XC17256E	XC17S05/XL XC17S10/XL XC17S20/XL XC17S30/XL XC17S40/XL	XC18V01 XC18V02 XC18V04	XC4003/E XC4005/E XC4006/E XC4008/E XC4010/E XC4013/E XC4020/E XC4025/E	XC4028EX XC4036EX	XC4005XL XC4010XL XC4013XL XC4020XL XC4028XL XC4036XL XC4044XL XC4052XL XC4062XL XC4085XL	XC4013XLA XC4020XLA XC4044XLA XC4028XLA XC4036XLA XC4062XLA XC4085XLA	XC40110XV XC40200XV XC40150XV XC40250XV

LCA XCSXX/XL	LCA XC5XXX	LCA XC2SXXX	LCA XCVXXXX	LCA XCVXXXXE	CoolRunner XCRXXXX	FLASH XC95XXX/XL
XCS05/XL XCS10/XL XCS20/XL XCS30/XL XCS40/XL	XC5202 XC5204 XC5206 XC5210 XC5215	XC2S15 XC2S30 XC2S50 XC2S100 XC2S150 XC2S200	XCV50 XCV100 XCV150 XCV200 XCV300 XCV400 XCV600 XCV800 XCV1000	XCV100E XCV200E XCV300E XCV400E XCV600E XCV800E XCV1000E XCV1600E XCV2000E XCV3200E	XCR3960 XCR5064 XCR3(5)032 XCR3(5)064 XCR3(5)128 XCR22(L)V10 XCR3256XL XCR3064XL XCR3128XL	XC9536/XL XC9572/XL XC95108/XL XC95216/XL XC95288/XL

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

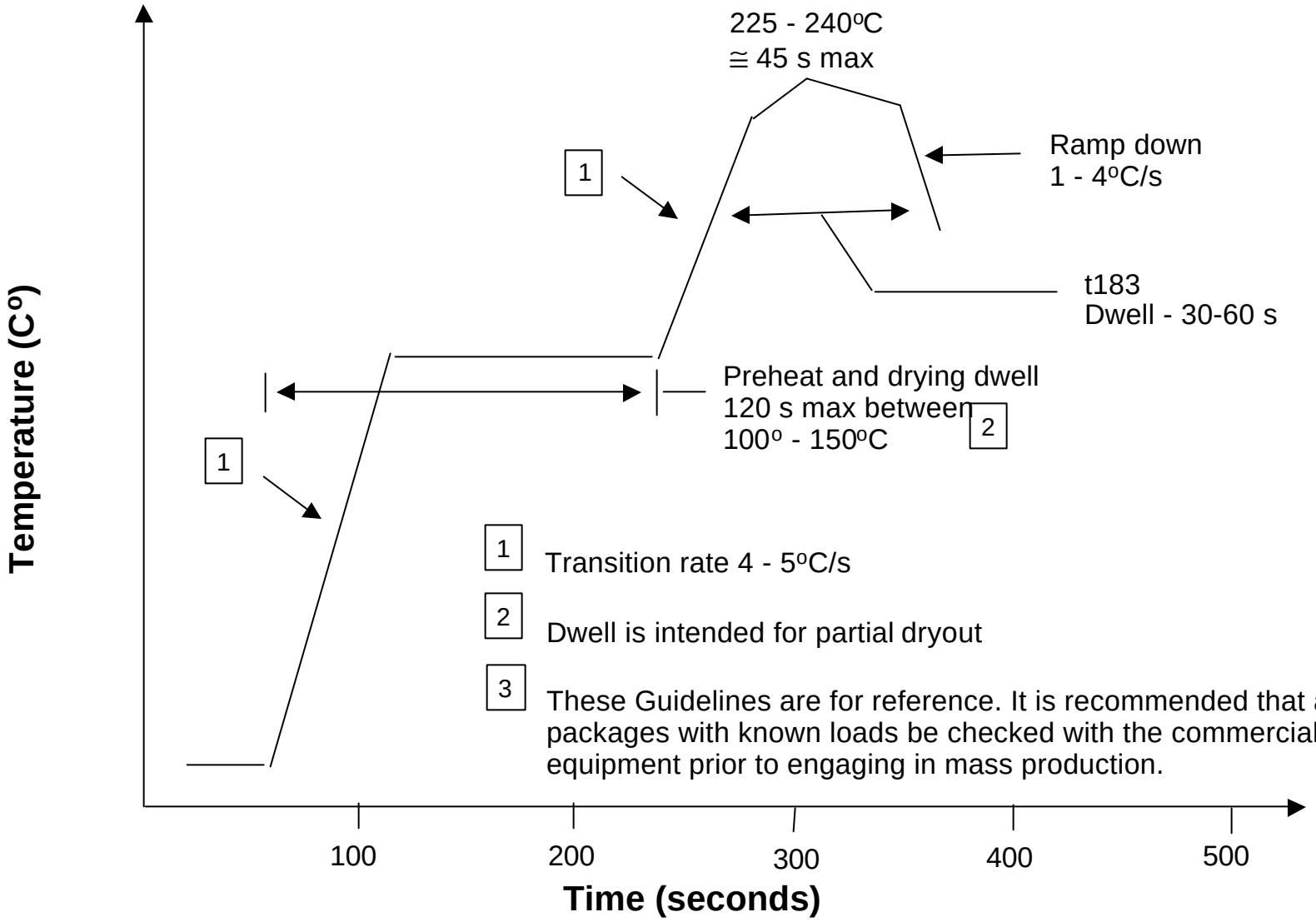
TABLE III

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	CRCP	Crack in the passivation
MST	Moisture in package	INC	Inconclusive
MARG	Marginal parametric failure	RAND	Random defect
NDF	No Defect found	VCMD	Via contact to metal defect
PFSM	Particle found in 2 Metal causing short	VUO	Via opened
GAOD	Gate Oxide Defect		
MSKD	Mask defect		

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

XILINX Typical I.R. Convection Oven Reflow



Product Moisture Classification

PD-8	XC1700D/E & XC17SXX, XC18VXX	Level 1 / Unlimited
SO-8, SO-20	XC1700D/E & XC17SXX, XC18VXX	Level 1 / Unlimited
VO-8	XC1700D/E & XC17SXX, XC18VXX	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 (44, 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
CP (56)	XCR3064A/L	Level 3 / 168 hours
MQFP (208, 240)	ALL	Level 1 / Unlimited
BGA (225, 256)	ALL	Level 3 / 168 hours
SBGA (352, 432, 560, 728)	ALL	Level 3 / 168 hours
SBGA (560)	XC4085XL	Level 3 / 168 hours
FBGA (256, 456, 556, 676, 680, 900, 860, 1156)	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.

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		350 mA Vcc 3.9V -350mA Gnd -1.2V	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

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	±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 to ±3000V		
XCSXX	±6000V		±1000V (10)
XCSXXXL	±3000V		±500V (13)
XC5XXX	±3000V to ±7000V		±2000V (8)
XC2SXXX	±2000V		
XC95XXX	±2000V to ±8000V		±2000V (9)
XC95XXXL	±2000V to ±6000V		±1000V (12)
XCRXXXX	±2000V to ±4000V		±500V (14)

(8) Measured on XC5210, (9) Measured on XC95108, (10) Measured on XCS10 & XCS30, (11) Measured on XC4062XLA, Measured on XC9536XL, Measured on XCS30XL, Measured on XCR3064

The FPGA Products

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:	**Oct. 1, 1998 to Oct. 1, 2000**			
Combined Lots:	**8**	**1**	**5**	**8**
Failures:	**0**	**0**	**0**	**0**
Device on test:	**364**	**45**	**223**	**352**
Actual device hours:	**307,159**	**46,485**	**158,146**	**289,256**
Mean :	**844**	**1,033**	**709**	**821**
Equivalent device hours @ Tj=125C:	**815,349**	**123,394**	**419,796**	**767,560**
Equivalent device hours @ Tj=55C:	**63,452,840**	**9,602,861**	**32,669,766**	**59,733,784**
Equivalent device hours @ Tj=25C:	**7.67E+08**	**1.16E+08**	**3.95E+08**	**7.22E+08**
Failure Rate(60% C.L.) in FITS @ Tj=55C:	**14**	**95**	**28**	**15**
Failure Rate(60% C.L.) in FITS @ Tj=25C:	**1**	**8**	**2**	**1**

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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:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Lots:	5	16	1	9
Failures:	0	0	0	1
Device on test:	312	611	43	371
Actual device hours:	169,487	589,006	152,908	386,935
Mean :	543	964	3,556	1,043
Equivalent device hours @ Tj=125C:	449,709	1,563,508	405,892	1,027,113
Equivalent device hours @ Tj=55C:	34,915,266	121,676,732	31,587,701	79,932,948
Equivalent device hours @ Tj=25C:	4.21E+08	1.47E+09	3.82E+08	9.66E+08
Failure Rate(60% C.L.) in FITS @ Tj=55C:	26	8	29	25
Failure Rate(60% C.L.) in FITS @ Tj=25C:	2	1	2	2

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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:	**Various**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

	XCSXXXL	XC4XXXXV	XC4XXXXLA	XCVXXX
Period:	**Oct. 1, 1998 to Oct. 1, 2000**			
Combined Lots:	**8**	**2**	**8**	**21**
Failures:	**2**	**0**	**0**	**6**
Device on test:	**349**	**37**	**370**	**1,025**
Actual device hours:	**368,529**	**55,736**	**300,374**	**1,117,744**
Mean :	**1,056**	**1,506**	**812**	**1,090**
Equivalent device hours @ Tj=125C:	**978,255**	**147,950**	**797,338**	**2,967,035**
Equivalent device hours @ Tj=55C:	**76,130,641**	**11,513,931**	**62,051,196**	**230,903,313**
Equivalent device hours @ Tj=25C:	**9.20E+08**	**1.39E+08**	**7.50E+08**	**2.79E+09**
Failure Rate(60% C.L.) in FITS @ Tj=55C:	**41**	**80**	**15**	**32**
Failure Rate(60% C.L.) in FITS @ Tj=25C:	**3**	**7**	**1**	**3**

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Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCVXXX(dynamic),XC5XXX, XCVXXXE, XC2SXXX
Package Type: Various
Actual Temperature: 145C +8C/-0C
Actual Voltage: Various
Assumed Activation Energy: 0.70 ev @ C.L. = 60%

	XCVXXX Dynamic	XCVXXXE	XC2SXXX	XC5XXX
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Lots:	2	12	5	7
Failures:	1	2	0	0
Device on test:	41	476	324	410
Actual device hours:	41,000	373,560	143,542	482,749
Mean :	1,000	785	443	1,177
Equivalent device hours @ Tj=125C:	108,834	830,355	381,030	1,281,450
Equivalent device hours @ Tj=55C:	8,469,771	64,620,655	29,652,875	99,276,184
Equivalent device hours @ Tj=25C:	1.02E+08	7.81E+08	3.59E+08	1.21E+09
Failure Rate(60% C.L.) in FITS @ Tj=55C:	239	48	31	9
Failure Rate(60% C.L.) in FITS @ Tj=25C:	20	4	3	1

XILINX®

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:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Lots:	**1**	**2**	**3**
Failures:	**0**	**0**	**0**
Device on test:	**47**	**90**	**137**
Actual device hours:	**12,032**	**93,510**	**106,802**
Mean :	**256**	**1,039**	**780**
Equivalent device hours @ Tj=125C:	**31,939**	**248,221**	**283,504**
Equivalent device hours @ Tj=55C:	**2,485,568**	**19,317,275**	**22,063,134**
Equivalent device hours @ Tj=25C:	**3.01E+07**	**2.34E+08**	**2.67E+08**
Failure Analysis:			

XILINX®

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:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Lots:	**1**	**1**	**8**
Failures:	**0**	**0**	**0**
Device on test:	**45**	**45**	**364**
Actual device hours:	**46,035**	**48,780**	**307,159**
Mean :	**1,023**	**1,084**	**844**
Equivalent device hours @ Tj=125C:	**122,129**	**129,486**	**815,349**
Equivalent device hours @ Tj=55C:	**9,509,900**	**10,076,962**	**63,452,840**
Equivalent device hours @ Tj=25C:	**1.22E+08**	**1.22E+08**	**7.67E+08**
Failure Analysis:			
Failure Rate (60% C.L.) in FITS @ Tj=55C:			**14**
Failure Rate (60% C.L.) in FITS @ Tj=25C:			**1**

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Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

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

	XC3190/A	XC31XX/A
Period:	Oct. 1, 1998 to Oct. 1, 2000	
Combined Lots:	1	1
Failures:	0	0
Device on test:	45	45
Actual device hours:	46,485	46,485
Mean :	1,033	1,033
Equivalent device hours @ Tj=125C:	123,341	123,394
Equivalent device hours @ Tj=55C:	9,576,169	9,602,861
Equivalent device hours @ Tj=25C:	1.16E+08	1.16E+08
Failure Analysis:		
Failure Rate (60% C.L.) in FITS @ Tj=55C:		95
Failure Rate (60% C.L.) in FITS @ Tj=25C:		8

XILINX®

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC4XXX Microcircuit Group**
Package Type:	**PLCC-84, PGA-156, 223, PQFP-208**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**5.7V +/-0.25**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

	XC4005	XC4010/L	XC4013	XC4XXX
Period:	**Oct. 1, 1998 to Oct. 1, 2000**			
Combined Lots:	**2**	**2**	**1**	**5**
Failures:	**0**	**0**	**0**	**0**
Device on test:	**92**	**84**	**47**	**223**
Actual device hours:	**60,812**	**85,302**	**12,032**	**158,146**
Mean :	**661**	**1,016**	**256**	**709**
Equivalent device hours @ Tj=125C:	**161,425**	**226,433**	**31,939**	**419,796**
Equivalent device hours @ Tj=55C:	**12,562,530**	**17,621,669**	**2,485,568**	**32,669,766**
Equivalent device hours @ Tj=25C:	**1.52E+08**	**2.13E+08**	**3.01E+07**	**3.95E+08**

Failure Analysis:

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

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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, 191, 223, PQFP-208,240, HQFP-240**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**5.7V +/-0.25**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

	XC4005E	XC40010E	XC4013E	XC4025E	XC4XXXE
Period:		**Oct. 1, 1998 to Oct. 1, 2000**			
Combined Lots:	**1**	**1**	**5**	**1**	**8**
Failures:	**0**	**0**	**0**	**0**	**0**
Device on test:	**45**	**47**	**218**	**42**	**352**
Actual device hours:	**48,780**	**12,032**	**177,524**	**50,820**	**289,256**
Mean :	**1,084**	**256**	**814**	**1,210**	**821**
Equivalent device hours @ Tj=125C:	**129,486**	**31,939**	**471,235**	**134,901**	**767,560**
Equivalent device hours @ Tj=55C:	**10,076,962**	**2,485,568**	**36,672,869**	**10,498,385**	**59,733,784**
Equivalent device hours @ Tj=25C:	**1.22E+08**	**3.01E+07**	**4.43E+08**	**1.27E+08**	**7.22E+08**

Failure Analysis:

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

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Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC4XXXEX Microcircuit Group**
Package Type:	**HQFP-240, 208**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**5.7V +/-0.25**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

	XC4028EX	XC4XXXEX
Period:	**Oct. 1, 1998 to Oct. 1, 2000**	
Combined Lots:	**5**	**5**
Failures:	**0**	**0**
Device on test:	**312**	**312**
Actual device hours:	**169,487**	**169,487**
Mean :	**543**	**543**
Equivalent device hours @ Tj=125C:	**449,901**	**449,901**
Equivalent device hours @ Tj=55C:	**35,012,588**	**35,012,588**
Equivalent device hours @ Tj=25C:	**4.23E+08**	**4.23E+08**
Failure Analysis:		
Failure Rate (60% C.L.) in FITS @ Tj=55C:		**26**
Failure Rate (60% C.L.) in FITS @ Tj=25C:		**2**

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Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC4XXXXL Microcircuit Group**
Package Type:	**PLCC-84, PGA- 411, 475 , 559, HQFP-208, 240 PQFP-208, CB228**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**3.6V +/-0.3**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

	XC4005XL	XC4013XL	XC4028XL	XC4036XL
Period:	**Oct. 1, 1998 to Oct. 1, 2000**			
Combined Lots:	**1**	**5**	**2**	**2**
Failures:	**0**	**0**	**0**	**0**
Device on test:	**43**	**229**	**83**	**87**
Actual device hours:	**66,478**	**162,619**	**83,205**	**88,191**
Mean :	**1,546**	**710**	**1,002**	**1,014**
Equivalent device hours @ Tj=125C:	**176,465**	**431,670**	**220,866**	**234,102**
Equivalent device hours @ Tj=55C:	**13,733,011**	**33,593,798**	**17,188,471**	**18,218,478**
Equivalent device hours @ Tj=25C:	**1.66E+08**	**4.06E+08**	**2.08E+08**	**2.20E+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- 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%**

	XC4044XL	XC4052XL	XC4062XL	XC4085XL	XC4XXXXL
Period:		**Oct. 1, 1998 to Oct. 1, 2000**			
Combined Lots:	**1**	**1**	**4**	**2**	**16**
Failures:	**0**	**0**	**0**	**0**	**0**
Device on test:	**22**	**22**	**125**	**63**	**611**
Actual device hours:	**21,736**	**22,022**	**144,755**	**56,016**	**589,006**
Mean :	**988**	**1,001**	**1,158**	**889**	**964**
Equivalent device hours @ Tj=125C:	**57,698**	**58,457**	**294,250**	**148,694**	**1,563,508**
Equivalent device hours @ Tj=55C:	**4,490,218**	**4,549,300**	**29,903,456**	**11,571,773**	**121,676,732**
Equivalent device hours @ Tj=25C:	**5.43E+07**	**5.50E+07**	**3.62E+08**	**1.40E+08**	**1.47E+09**

Failure Analysis:

Failure Rate (60% C.L.) in FITS @ Tj=55C:	**8**
Failure Rate (60% C.L.) in FITS @ Tj=25C:	**1**

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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:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Lots:	**2**	**1**	**3**
Failures:	**0**	**0**	**0**
Device on test:	**120**	**42**	**125**
Actual device hours:	**63,076**	**44,394**	**106,922**
Mean :	**526**	**1,057**	**855**
Equivalent device hours @ Tj=125C:	**167,434**	**117,843**	**283,823**
Equivalent device hours @ Tj=55C:	**13,030,226**	**9,170,903**	**22,087,924**
Equivalent device hours @ Tj=25C:	**1.58E+08**	**1.11E+08**	**2.67E+08**
Failure Analysis:			

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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:	**Oct. 1, 1998 to Oct. 1, 2000**	
Combined Lots:	**2**	**8**
Failures:	**0**	**0**
Device on test:	**83**	**370**
Actual device hours:	**85,982**	**300,374**
Mean :	**1,036**	**812**
Equivalent device hours @ Tj=125C:	**228,238**	**797,338**
Equivalent device hours @ Tj=55C:	**17,762,143**	**62,051,196**
Equivalent device hours @ Tj=25C:	**2.15E+08**	**7.50E+08**

Failure Analysis:

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

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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%**

Dynamic

	XC4005XL	XC4XXXXL
Period:	**Oct. 1, 1998 to Oct. 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:	**405,892**	**405,892**
Equivalent device hours @ Tj=55C:	**31,587,701**	**31,587,701**
Equivalent device hours @ Tj=25C:	**3.82E+08**	**3.82E+08**
Failure Analysis:		
Failure Rate (60% C.L.) in FITS @ Tj=55C:		**29**
Failure Rate (60% C.L.) in FITS @ Tj=25C:		**2**

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Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XCSXX 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%**

	XCS10	XCS20	XCS30	XCS40	XCSXX
Period:		**Oct. 1, 1998 to Oct. 1, 2000**			
Combined Lots:	**1**	**1**	**5**	**2**	**9**
Failures:	**0**	**0**	**1**	**0**	**1**
Device on test:	**45**	**42**	**202**	**82**	**371**
Actual device hours:	**49,860**	**42,714**	**212,361**	**82,000**	**386,835**
Mean :	**1,108**	**1,017**	**1,051**	**1,000**	**1,043**
Equivalent device hours @ Tj=125C:	**132,353**	**113,384**	**563,709**	**217,668**	**1,027,113**
Equivalent device hours @ Tj=55C:	**10,300,068**	**8,823,849**	**43,869,489**	**16,939,542**	**79,932,948**
Equivalent device hours @ Tj=25C:	**1.25E+08**	**1.07E+08**	**5.30E+08**	**2.05E+08**	**9.66E+08**

Failure Analysis: F/A99119(1)-INC

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

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Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XCSXXXL Microcircuit Group**
Package Type:	**PGA- 191, 223, PQFP-208, PLCC-84**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**3.6V +/-0.3**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

	XCS05XL	XCS10XL	XCS20XL
Period:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Lots:	**1**	**1**	**3**
Failures:	**0**	**0**	**2**
Device on test:	**45**	**44**	**104**
Actual device hours:	**50,715**	**49,588**	**107,900**
Mean :	**1,127**	**1,127**	**1,038**
Equivalent device hours @ Tj=125C:	**134,622**	**131,631**	**286,419**
Equivalent device hours @ Tj=55C:	**10,476,694**	**10,243,878**	**22,289,959**
Equivalent device hours @ Tj=25C:	**1.27E+08**	**1.24E+08**	**2.69E+08**
Failure Analysis:			**F/A98139(2)-RAND**

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Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XCSXXXL Microcircuit Group**
Package Type:	**PGA- 191, 223, PQFP-208, PLCC-84**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**3.6V +/-0.3**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

	XCS30XL	XCS40XL	XCSXXXL
Period:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Lots:	**1**	**2**	**8**
Failures:	**0**	**0**	**2**
Device on test:	**72**	**84**	**349**
Actual device hours:	**72,000**	**88,326**	**368,529**
Mean :	**1,000**	**1,052**	**1,056**
Equivalent device hours @ Tj=125C:	**191,123**	**234,460**	**978,255**
Equivalent device hours @ Tj=55C:	**14,873,744**	**18,246,366**	**76,130,641**
Equivalent device hours @ Tj=25C:	**1.80E+08**	**2.21E+08**	**9.20E+08**
Failure Analysis:			
Failure Rate (60% C.L.) in FITS @ Tj=55C:			**41**
Failure Rate (60% C.L.) in FITS @ Tj=25C:			**3**

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Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC2SXXX Microcircuit Group**
Package Type:	**PQFP-208**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**2.7V (Core);3.7V(I/O)**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

	XC2S50	XC2S100	XC2S150	XC2SXXX
Period:	**Oct. 1, 1998 to Oct. 1, 2000**			
Combined Lots:	**1**	**1**	**3**	**5**
Failures:	**0**	**0**	**0**	**0**
Device on test:	**76**	**76**	**172**	**324**
Actual device hours:	**13,604**	**13,908**	**116,030**	**143,542**
Mean :	**179**	**183**	**675**	**443**
Equivalent device hours @ Tj=125C:	**36,112**	**36,919**	**308,000**	**381,030**
Equivalent device hours @ Tj=55C:	**2,810,311**	**2,873,112**	**23,969,452**	**29,652,875**
Equivalent device hours @ Tj=25C:	**3.40E+07**	**3.47E+07**	**2.90E+08**	**3.59E+08**
Failure Analysis:				
Failure Rate (60% C.L.) in FITS @ Tj=55C:				**31**
Failure Rate (60% C.L.) in FITS @ Tj=25C:				**3**

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Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC4XXXXV Microcircuit Group**
Package Type:	**PG-599**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**2.625V (Core);3.6V(I/O)**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

	XC40110XV	XC40150XV	XC4XXXXV
Period:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Lots:	**1**	**1**	**2**
Failures:	**0**	**0**	**0**
Device on test:	**15**	**22**	**37**
Actual device hours:	**32,460**	**23,276**	**55,736**
Mean :	**2,164**	**1,058**	**1,506**
Equivalent device hours @ Tj=125C:	**86,165**	**61,786**	**147,950**
Equivalent device hours @ Tj=55C:	**6,705,580**	**4,808,351**	**11,53,931**
Equivalent device hours @ Tj=25C:	**8.11E+07**	**5.81E+07**	**1.39E+08**

Failure Analysis:	**Failure Rate (60% C.L.) in FITS @ Tj=55C:**	**80**
	Failure Rate (60% C.L.) in FITS @ Tj=25C:	**7**

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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%**

	XCV50	XCV100	XCV150	XCV200	XCV300
Period:		**Oct. 1, 1998 to Oct. 1, 2000**			
Combined Lots:	**1**	**1**	**1**	**2**	**6**
Failures:	**0**	**0**	**0**	**1**	**2**
Device on test:	**66**	**76**	**76**	**152**	**423**
Actual device hours:	**33,000**	**76,836**	**39,216**	**153,374**	**487,019**
Mean :	**500**	**1,011**	**516**	**1,009**	**1,151**
Equivalent device hours @ Tj=125C:	**87,598**	**203,960**	**104,098**	**407,129**	**1,292,785**
Equivalent device hours @ Tj=55C:	**6,817,133**	**15,872,764**	**8,101,233**	**31,683,968**	**100,608,279**
Equivalent device hours @ Tj=25C:	**8.24E+07**	**1.92E+08**	**9.79E+07**	**3.83E+08**	**1.22E+09**
Failure Analysis:				**F/A99095(1)-NDF**	**F/A99029(1)-INC** **FA00072(1)-RAND**

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Reliability Testing Summary
High Temperature Life Test
Qualification

Technology:	**Si Gate CMOS**
Device Type:	**XCVXXX Microcircuit Group**
Package Type:	**HQFP-240, PQFP-240, *BG560**
Actual Temperature	**145C +8C/-0C; 125C***
Actual Voltage:	**2.625V (Core); 3.6V (I/O)**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

	XCV400	XCV600	XCV800	XCV1000	XCVXXX	
Period:			**Oct. 1, 1998 to Oct. 1, 2000**			
					*	
Combined Lots:	**1**	**2**	**3**	**4**	**1**	**21**
Failures:	**0**	**1**	**0**	**2**	**0**	**6**
Device on test:	**76**	**44**	**49**	**63**	**5**	**1,025**
Actual device hours:	**114,000**	**65,564**	**61,523**	**90.328**	**1,884**	**1,117,744**
Mean :	**1,500**	**1,490**	**1,256**	**1,434**	**377**	**1,090**
Equivalent device hours @ Tj=125C:	**302,611**	**174,039**	**163,312**	**239,774**	**5,001**	**2,967,035**
Equivalent device hours @ Tj=55C:	**23,550,095**	**13,544,197**	**12,709,408**	**18,659,939**	**389,196**	**230,903,313**
Equivalent device hours @ Tj=25C:	**2.85E+08**	**1.64E+08**	**1.54E+08**	**2.26E+08**	**4.71E+06**	**2.79E+09**
Failure Analysis:	**F/A 00025(1)-FANC**			**F/A99035(2)-NDF**		

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

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

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Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XCVXXX Microcircuit Group**
Package Type:	**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%**

Dynamic

	XCV300	XCVXXX
Period:	**Oct. 1, 1998 to Oct. 1, 2000**	
Combined Lots:	**2**	**2**
Failures:	**1**	**0**
Device on test:	**41**	**41**
Actual device hours:	**41,000**	**41,000**
Mean :	**1,000**	**1,000**
Equivalent device hours @ Tj=125C:	**108,834**	**108,834**
Equivalent device hours @ Tj=55C:	**8,469,771**	**8,469,771**
Equivalent device hours @ Tj=25C:	**1.02E+08**	**1.02E+08**
Failure Analysis:	**F/A00084(1)-FANC**	
Failure Rate (60% C.L.) in FITS @ Tj=55C:		**239**
Failure Rate (60% C.L.) in FITS @ Tj=25C:		**20**

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Reliability Testing Summary
High Temperature Life Test
Qualification

Technology:	**Si Gate CMOS**
Device Type:	**XCVXXXE Microcircuit Group**
Package Type:	**HQFP-240, PQFP-240, BG560**
Actual Temperature	**145C +8C/-0C, *125C**
Actual Voltage:	**2.2V (Core); 3.6V (I/O)**
Assumed Activation Energy:	**0.70 ev @ C.L. = 60%**

	XCV300E	XCV1000E	XCV2000E	XCVXXXE	
Period:		**Oct. 1, 1998 to Oct. 1, 2000**			
Combined Lots:	**5**	**1**	***4**	***3**	**13**
Failures:	**2**	**0**	**0**	**0**	**2**
Device on test:	**340**	**22**	**78**	**60**	**500**
Actual device hours:	**253,941**	**22,154**	**23,917**	**18,144**	**318,156**
Mean :	**747**	**1,007**	**814**	**802**	**636**
Equivalent device hours @ Tj=125C:	**674,083**	**58,807**	**63,459**	**48,142**	**844,540**
Equivalent device hours @ Tj=55C:	**52,459,077**	**4,576,569**	**4,940,769**	**3,748,184**	**65,724,597**
Equivalent device hours @ Tj=25C:	**6.34E+08**	**5.53E+07**	**5.97E+07**	**4.53E+07**	**7.95E+08**

Failure Analysis: F/A99262(1)-GAOD
F/A00061(1)-MSKD

Failure Rate(60% C.L.) in FITS @ Tj=55C:	**47**
Failure Rate(60% C.L.) in FITS @ Tj=25C:	**4**

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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-208, 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:		**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Lots:	**1**	**2**	**4**	**7**
Failures:	**0**	**0**	**0**	**0**
Device on test:	**45**	**129**	**236**	**410**
Actual device hours:	**48,780**	**197,239**	**236,730**	**482,749**
Mean :	**1,084**	**1,529**	**1,003**	**1,177**
Equivalent device hours @ Tj=125C:	**129,431**	**523,568**	**628,396**	**1,281,450**
Equivalent device hours @ Tj=55C:	**10,048,952**	**40,745,590**	**48,903,632**	**99,726,184**
Equivalent device hours @ Tj=25C:	**1.21E+08**	**4.93E+08**	**5.91E+08**	**1.21E+09**

Failure Analysis:

Failure Rate (60% C.L.) in FITS @ Tj=55C:	**9**
Failure Rate (60% C.L.) in FITS @ Tj=25C:	**1**

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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

	XC3XXX/A	XC4XXX	XC4XXXE	XC4XXXXL*
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	3	2	4	7
Combined Completed Lots:	3	2	4	7
Failures:	0	0	0	0
Device on test:	140	150	131	230
Mean Test Hour s/Device:	1,068	903	1,141	1,009
Total Device Hours:	149,530	135,484	149,526	232,026

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

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

	XC4XXXXLA*	XCVXXX**	XCSXXXL	XCSXX
Period:		Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	3	3	1	1
Combined Completed Lots:	3	3	1	1
Failures:	0	0	0	0
Device on test:	126	119	11	45
Mean Test Hour s/Device:	1,026	1,098	1,019	1,000
Total Device Hours:	129,256	130,691	11,209	45,000

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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, 44**
Test Condition:	**T = 85C, R.H. = 85%**
Bias Voltages:	**5.0V +/- .25V**

	XC3030/A	XC3042/A	XC3XXX/A
Period:		**Oct. 1, 1998 to Oct. 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:	**1,045**	**1,117**	**1,068**
Total Device Hours:	**99,265**	**50,265**	**149,530**
Failure Analysis Number:			

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

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

	XC4013	XC4XXX
Period:	**Oct. 1, 1998 to Oct. 1, 2000**	
Combined Started Lot:	**2**	**2**
Combined Completed Lots:	**2**	**2**
Failures:	**0**	**0**
Device on test:	**150**	**150**
Mean Test Hour s/Device:	**903**	**903**
Total Device Hours:	**135,484**	**135,484**
Failure Analysis Number:		

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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
Test Condition: T = 85C, R.H. = 85%
Bias Voltages: 5.0V +/- .25V

	XC4006E	XC4010E	XC4013E	XC4025E	XC4XXXE
Period:	Oct. 1, 1998 to Oct. 1, 2000				
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:	21	45	43	22	131
Mean Test Hour s/Device:	1,000	1,148	1,234	1,082	1,141
Total Device Hours:	21,000	51,660	53,062	23,804	149,526
Failure Analysis Number:					

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

Technology:	**Si Gate CMOS**
Device Type:	**XC4XXXXL Microcircuit Group**
Package Type:	**BGA-560, PQFP-240, HT-144, PLCC-84**
Test Condition:	**T = 85C, R.H. = 85%**
Bias Voltages:	**3.3V +/- .3V**

	XC4010XL	XC4013XL	XC4020XL
Period:	**July 1, 1998 to July 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:	**1,006**	**1,019**	**935**
Total Device Hours:	**45,270**	**45,855**	**84,105**
Failure Analysis Number:			

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

Technology:	**Si Gate CMOS**
Device Type:	**XC4XXXXL Microcircuit Group**
Package Type:	**BGA-560, PQFP-240, HT-144, PLCC-84**
Test Condition:	**T = 85C, R.H. = 85%**
Bias Voltages:	**3.3V +/- .3V**

	XC4062XL	XC4085XL	XC4XXXXL
Period:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Started Lot:	**1**	**2**	**7**
Combined Completed Lots:	**1**	**2**	**7**
Failures:	**0**	**0**	**0**
Device on test:	**14**	**36**	**230**
Mean Test Hour s/Device:	**1,008**	**1,186**	**1,009**
Total Device Hours:	**14,112**	**42,684**	**232,026**
Failure Analysis Number:			

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

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

	XC4013XLA	XC4062XLA	XC4XXXXLA
Period:		**Oct. 1, 1998 to Oct. 1, 2000**	
Combined Started Lot:	**1**	**2**	**3**
Combined Completed Lots:	**1**	**2**	**3**
Failures:	**0**	**0**	**0**
Device on test:	**37**	**89**	**126**
Mean Test Hour s/Device:	**1,071**	**1,007**	**1,026**
Total Device Hours:	**39,627**	**89,629**	**129,256**
Failure Analysis Number:			

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

Technology:	**Si Gate CMOS**
Device Type:	**XCVXXX Microcircuit Group**
Package Type:	**CS-144, TQFP-144, BGA-432**
Test Condition:	**T = 85C, R.H. = 85%**
Bias Voltages:	**2.7V +/- .3V**

	XCV100	XCV800	XCVXXX
Period:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Started Lot:	**2**	**1**	**3**
Combined Completed Lots:	**2**	**1**	**3**
Failures:	**0**	**0**	**0**
Device on test:	**103**	**16**	**119**
Mean Test Hour s/Device:	**1,088**	**1,166**	**1,098**
Total Device Hours:	**112,035**	**18,656**	**130,691**
Failure Analysis Number:			

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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:	**Oct. 1, 1998 to Oct. 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:	**1,000**	**1,000**
Total Device Hours:	**45,000**	**45,000**
Failure Analysis Number:		

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

Technology:	**Si Gate CMOS**
Device Type:	**XCSXXXL Microcircuit Group**
Package Type:	**TQFP-144**
Test Condition:	**T = 85C, R.H. = 85%**
Bias Voltages:	**3.3V +/- .3V**

	XCS30XL	XCSXXXL
Period:	**Oct. 1, 1998 to Oct. 1, 2000**	
Combined Started Lot:	**1**	**1**
Combined Completed Lots:	**1**	**1**
Failures:	**0**	**0**
Device on test:	**11**	**11**
Mean Test Hour s/Device:	**1,019**	**1,019**
Total Device Hours:	**11,209**	**11,209**
Failure Analysis Number:		

XILINX®

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:		Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	4	1	5	10
Combined Completed Lots:	4	1	5	10
Failures:	0	0	0	0
Device on test:	210	45	261	383
Mean Test Hour s/Device:	129	96	104	115
Total Device Hours:	27,120	4,320	27,144	44,112

XILINX®

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

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

	XCSXXXL	XC4XXXXL	XCXXXXV
Period:	Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	4	12	2
Combined Completed Lots:	4	12	2
Failures:	0	0	0
Device on test:	173	380	59
Mean Test Hour s/Device:	152	115	96
Total Device Hours:	26,352	43,536	5,664

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Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

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

	XC4XXXXLA	XCVXXX	XCVXXXXE
Period:	Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	5	10	6
Combined Completed Lots:	5	10	6
Failures:	0	0	0
Device on test:	170	439	142
Mean Test Hour s/Device:	132	132	149
Total Device Hours:	22,512	57,984	21,192

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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
Test Condition: T = 121C; 2 atm. sat. steam.

	XC3030/A	XC3XXX/A
Period:	Oct. 1, 1998 to Oct. 1, 2000	
Combined Started Lot:	4	4
Combined Completed Lots:	4	4
Failures:	0	0
Device on test:	210	210
Mean Test Hour s/Device:	129	129
Total Device Hours:	27,120	27,120
Failure Analysis Number:		

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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:	Oct. 1, 1998 to Oct. 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:		

XILINX®

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

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

	XC4006	XC4010	XC4013	XC4XXX
Period:		Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	1	2	2	5
Combined Completed Lots:	1	2	2	5
Failures:	0	0	0	0
Device on test:	44	65	152	261
Mean Test Hour s/Device:	96	72	120	104
Total Device Hours:	4,224	4,680	18,240	27,144
Failure Analysis Number:				

XILINX®

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, VQFP-100
Test Condition: T = 121C; 2 atm. sat. steam

	XC4003E	XC4010E	XC4013E	XC4025E	XC4XXXE
Period:	Oct. 1, 1998 to Oct. 1, 2000				
Combined Started Lot:	1	1	3	5	10
Combined Completed Lots:	1	1	3	5	10
Failures:	0	0	0	0	0
Device on test:	44	35	108	196	383
Mean Test Hour s/Device:	168	96	111	109	115
Total Device Hours:	7,392	3,360	11,952	21,408	44,112
Failure Analysis Number:					

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCSXXXL Microcircuit Group
Package Type: VQFP-100, TQFP-144, CS-280
Test Condition: T = 121C; 2 atm. sat. steam

	XCS30XL	XCS40XL	XCSXXXL
Period:	Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	3	1	4
Combined Completed Lots:	3	1	4
Failures:	0	0	0
Device on test:	132	41	173
Mean Test Hour s/Device:	170	96	152
Total Device Hours:	22,416	3,936	26,352
Failure Analysis Number:			

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Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

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

	XC4010XL	XC4013XL	XC4020XL	XC4036XL
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	2	2	1	3
Combined Completed Lots:	2	2	1	3
Failures:	0	0	0	0
Device on test:	121	90	20	32
Mean Test Hour s/Device:	141	96	96	96
Total Device Hours:	17,088	8,640	1,920	3,072
Failure Analysis Number:				

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Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC4XXXXL Microcircuit Group**
Package Type:	**PQFP-240, BGA-256,352, 432, 560**
	TQFP-176, HT-144, PLCC-84
Test Condition:	**T = 121C; 2 atm. sat. steam**

	XC4052XL	XC4062XL	XC4085XL	XC4XXXXL
Period:		**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Started Lot:	**1**	**2**	**1**	**12**
Combined Completed Lots:	**1**	**2**	**1**	**12**
Failures:	**0**	**0**	**0**	**0**
Device on test:	**31**	**63**	**23**	**380**
Mean Test Hour s/Device:	**96**	**121**	**96**	**115**
Total Device Hours:	**2,976**	**7,632**	**2,208**	**43,536**
Failure Analysis Number:				

XILINX®

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:	Oct. 1, 1998 to Oct. 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:		

XILINX®

Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4XXXXLA Microcircuit Group
Package Type: BGA-560, HQFP-240,304, PQFP-240
Test Condition: T = 121C; 2 atm. sat. steam

	XC4013XLA	XC4044XLA	XC4062XLA	XC4085XLA	XC4XXXXLA
Period:	Oct. 1, 1998 to Oct. 1, 2000				
Combined Started Lot:	1	1	2	1	5
Combined Completed Lots:	1	1	2	1	5
Failures:	0	0	0	0	0
Device on test:	41	31	67	31	170
Mean Test Hour s/Device:	168	96	144	96	132
Total Device Hours:	6,888	2,976	9,672	2,976	22,512
Failure Analysis Number:					

XILINX®

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:	Oct. 1, 1998 to Oct. 1, 2000				
Combined Started Lot:	2	3	3	2	10
Combined Completed Lots:	2	3	3	2	10
Failures:	0	0	0	0	0
Device on test:	122	148	116	53	439
Mean Test Hour s/Device:	168	133	96	126	132
Total Device Hours:	20,496	19,680	11,136	6,672	57,984
Failure Analysis Number:					

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Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCVXXXXE Microcircuit Group
Package Type: BGA-560, 728, FG900, 1156
Test Condition: T = 121C; 2 atm. sat. steam

	XCV1000E	XCV1600E	XCV2000E	XCVXXXXE
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	2	1	3	6
Combined Completed Lots:	2	1	3	6
Failures:	0	0	0	0
Device on test:	61	22	59	142
Mean Test Hour s/Device:	168	168	123	149
Total Device Hours:	10,248	3,696	7,248	21,192
Failure Analysis Number:				

XILINX®

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

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

	XC3XXX/A	XC31XX/A	XCSXX	XCSXXXXL	XC4XXX
Period:		Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	2	1	1	18	2
Combined Completed Lots:	2	1	1	18	2
Failures:	0	0	0	0	0
Device on test:	152	45	45	818	121
Mean Test Cycles/Device:	1,026	1,004	1,005	999	1,010
Total Device Cycles:	155,952	45,180	45,225	817,544	122,244
Failure Analysis Number:					

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

Technology: Si Gate CMOS
Device Type: XC4XXXXE, XC4XXXEX, XC4XXXXL,XC4XXXXLA, XC4XXXV
Package Type: Various
Test Condition: T = -65C / +150C (Air to Air)
T = -55C / +125C (Air to Air) for BGA,FG,CS

	XC4XXXE	XC4XXXEX	XC4XXXXL	XC4XXXXLA	XC4XXXXV
Period:		Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	8	4	19	12	3
Combined Completed Lots:	8	4	19	12	3
Failures:	0	0	1	0	0
Device on test:	349	179	679	552	95
Mean Test Cycles/Device:	1,046	885	980	979	1,010
Total Device Cycles:	365,097	158,350	665,704	540,191	95,968
Failure Analysis Number:					

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

Technology: Si Gate CMOS
Device Type: XCVXXX, XCVXXXE, XC5XXX
Package Type: Various
Test Condition: T = -65C / +150C (Air to Air)
T = -55C / +125C (Air to Air) for BGA,FG,CS

	XCVXXX	XCVXXXE	XC5XXX
Period:	Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	25	16	1
Combined Completed Lots:	25	16	1
Failures:	0	0	0
Device on test:	808	464	45
Mean Test Cycles/Device:	989	1,029	1,000
Total Device Cycles:	799,484	477,286	45,000
Failure Analysis Number:			

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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- 68, VQFP-64
Test Condition: T = -65C/+150C (Air to Air)

	XC3030/A	XC3XXX/A
Period:	Oct. 1, 1998 to Oct. 1, 2000	
Combined Started Lot:	2	2
Combined Completed Lots:	2	2
Failures:	0	0
Device on test:	152	152
Mean Test Cycles/Device:	1,026	1,026
Total Device Cycles:	155,592	155,592
Failure Analysis Number:		

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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:	Oct. 1, 1998 to Oct. 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:		

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

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

	XCS30	XCSXX
Period:	Oct. 1, 1998 to Oct. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	45	45
Mean Test Cycles/Device:	1,005	1,005
Total Device Cycles:	45,225	45,225
Failure Analysis Number:		

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

Technology: Si Gate CMOS
Device Type: XCSXX Microcircuit Group
Package Type: VQFP-100, PQFP-208, 240, CS-280
Test Condition: T = -65C/+150C (Air toAir)
*For CS-280 T=-55C/+125C (Air to Air)

	XCS30XL	XCS40XL*	XCS40XL	XCSXXXL
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	6	1	11	18
Combined Completed Lots:	6	1	11	18
Failures:	0	0	0	0
Device on test:	270	41	507	818
Mean Test Cycles/Device:	952	1,000	1,025	999
Total Device Cycles:	257,004	41,000	519,540	817,544
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, BG-225
Test Condition: T = -65C/+150C (Air to Air)
*For BGA, T=-55C/+125C (Air to Air)

	XC4006	XC4013*	XC4XXX
Period:	Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	1	1	2
Combined Completed Lots:	1	1	2
Failures:	0	0	0
Device on test:	45	76	121
Mean Test Cycle/Device:	1,004	1,014	1,010
Total Device Cycles:	45,180	77,064	122,244

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

Technology: Si Gate CMOS
Device Type: XC4XXXE Microcircuit Group
Package Type: PQFP-208, 240, HQFP-240, PGA-223
Test Condition: T = -65C/+150C (Air to Air)

	XC4010E	XC4013E	XC4025E	XC4XXXE
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	1	6	1	8
Combined Completed Lots:	1	6	1	8
Failures:	0	0	0	0
Device on test:	80	193	76	349
Mean Test Cycles/Device:	748	1,182	1,014	1,046
Total Device Cycles:	59,815	228,218	77,064	365,097

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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
Test Condition: T = -65C/+150C (Air to Air)

	XC4028EX	XC4XXXEX
Period:	Oct. 1, 1998 to Oct. 1, 2000	
Combined Started Lot:	4	4
Combined Completed Lots:	4	4
Failures:	0	0
Device on test:	179	179
Mean Test cycles/Device:	885	885
Total Device Cycles:	158,350	158,350

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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, PLCC-84
Test Condition: T = -65C/+150C (Air to Air)
*For BGA, T=-55C/+125C (Air to Air)

	XC4010XL	XC4013XL	XC4013XL*	XC4020XL	XC4020XL*
Period:	Oct. 1, 1998 to Oct. 1, 2000				
Combined Started Lot:	2	1	1	1	2
Combined Completed Lots:	2	1	1	1	2
Failures:	0	0	0	0	0
Device on test:	152	45	45	45	44
Mean Test Cycles/Device:	1,040	1,006	1,060	1,094	1,000
Total Device cycles:	158,080	45,270	47,700	49,230	44,000

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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, PLCC-84
Test Condition: T = -65C/+150C (Air to Air)
*For BGA, T=-55C/+125C (Air to Air)

	XC4028XL	XC4036XL*	XC4052XL*	XC4062XL
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	2	3	1	1
Combined Completed Lots:	2	3	1	1
Failures:	0	0	0	1
Device on test:	85	32	32	45
Mean Test Cycles/Device:	1,000	1,020	1,000	1,005
Total Device cycles:	85,000	32,638	32,000	45,225

F/A99036(1)-CRCP @1005 cy.

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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, PLCC-84**
Test Condition:	**T = -65C/+150C (Air to Air)** ***For BGA, T=-55C/+125C (Air to Air)**

	XC4062XL*	**XC4085XL***	**XC4XXXXL**
Period:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Started Lot:	**2**	**3**	**19**
Combined Completed Lots:	**2**	**3**	**19**
Failures:	**0**	**0**	**1**
Device on test:	**63**	**91**	**679**
Mean Test Cycles/Device:	**1,003**	**697**	**980**
Total Device cycles:	**63,176**	**63,385**	**665,704**

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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, BG-256, 560
Test Condition: T = -65C/+150C (Air to Air)
*For BGA, T=-55C/+125C (Air to Air)

	XC4013XLA	XC4020XLA*	XC4036XLA	XC4044XLA	XC4052XLA
Period:	Oct. 1, 1998 to Oct. 1, 2000				
Combined Started Lot:	2	1	3	1	1
Combined Completed Lots:	2	1	3	1	1
Failures:	0	0	0	0	0
Device on test:	90	22	190	45	45
Mean Test Cycles/Device:	1,115	1,000	839	1,017	1,121
Total Device Cycles:	100,350	22,000	159,322	45,765	50,445

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, BG-256, 560
Test Condition: T = -65C/+150C (Air to Air)
*For BGA, T=-55C/+125C (Air to Air)

	XC4062XLA	XC4085XLA	XC4085XLA*	XC4XXXXLA
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	2	1	1	12
Combined Completed Lots:	2	1	1	12
Failures:	0	0	0	0
Device on test:	75	41	44	552
Mean Test Cycles/Device:	1,008	1,000	1,000	979
Total Device Cycles:	75,587	42,722	44,000	540,191

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

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

	XC40150XV	XC40125XV*	XC4XXXXV
Period:	Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	1	2	3
Combined Completed Lots:	1	2	3
Failures:	0	0	0
Device on test:	30	65	95
Mean Test Cycles/Device:	1,000	1,015	1,010
Total Device Cycles:	30,000	65,968	95,968

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

Technology: Si Gate CMOS
Device Type: XCVXXX Microcircuit Group
Package Type: HQFP-240, CS-,144, TQFP-144, PQFP-240
FG-256,456,556,676,680, BGA-432-560
Test Condition: T = -65C/+150C (Air to Air)
*For CS, BGA,FG, T=-55C/+125C (Air to Air)

	XCV50	XCV100*	XCV100
Period:	Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	2	1	2
Combined Completed Lots:	2	1	2
Failures:	0	0	0
Device on test:	49	62	88
Mean Test Cycles/Device:	1,096	1,085	1,033
Total Device Cycles:	53,710	67,270	90,892

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

Technology: Si Gate CMOS
Device Type: XCVXXX Microcircuit Group
Package Type: HQFP-240, CS-,144, TQFP-144, PQFP-240
FG-256,456,556,676,680, BGA-432-560
Test Condition: T = -65C/+150C (Air to Air)
*For CS, BGA,FG, T=-55C/+125C (Air to Air)

	XCV200	XCV300	XCV300*	XCV600
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	4	4	2	1
Combined Completed Lots:	4	4	2	1
Failures:	0	0	0	0
Device on test:	138	151	44	22
Mean Test Cycles/Device:	1,010	877	1,028	1,036
Total Device Cycles:	139,342	132,376	45,232	22,792

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

Technology: Si Gate CMOS
Device Type: XCVXXX Microcircuit Group
Package Type: HQFP-240, CS-,144, TQFP-144, PQFP-240
FG-256,456,556,676,680, BGA-432-560
Test Condition: T = -65C/+150C (Air to Air)
*For CS, BGA,FG, T=-55C/+125C (Air to Air)

	XCV800	XCV800*	XCV1000*	XCVXXX
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	3	2	3	25
Combined Completed Lots:	3	2	3	25
Failures:	0	0	0	0
Device on test:	50	94	78	808
Mean Test Cycles/Device:	1,000	895	1,010	989
Total Device Cycles:	50,000	84,078	78,792	799,484

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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, FG456,900,1156, BGA-560, 728, CS-144
Test Condition: T = -65C/+150C (Air to Air)
*For FG,BGA, CS, T=-55C/+125C (Air to Air)

	XCV200E	XCV300E	XCV300E*	XCV1600E
Period:		Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	1	2	2	1
Combined Completed Lots:	1	2	2	1
Failures:	0	0	0	0
Device on test:	74	141	20	22
Mean Test Cycles/Device:	1,000	1,057	1,023	1,000
Total Device Cycles:	74,000	149,103	20,464	22,000

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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, FG456,900,1156, BGA-560, 728, CS-144
Test Condition: T = -65C/+150C (Air to Air)
*For FG,BGA, CS, T=-55C/+125C (Air to Air)

	XCV1000E	XCV1000E*	XCV2000E*	XCVXXXE
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	1	3	5	16
Combined Completed Lots:	1	3	5	16
Failures:	0	0	0	0
Device on test:	24	77	84	464
Mean Test Cycles/Device:	1,084	1,124	919	1,029
Total Device Cycles:	26,016	86,515	77,188	477,286

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
Test Condition: T = -65C/+150C (Air to Air)

	XC5202	XC5XXX
Period:	Oct. 1, 1998 to Oct. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	45	45
Mean Test Cycles/Device:	1,000	1,000
Total Device Cycles:	45,000	45,000
Failure Analysis Number:		

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Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC3XXX, XC4XXX/E, XC4XXXXLA Microcircuit Group
Package Type: Various
Test Condition: T = 130C, R.H. = 85%
Bias Voltage: 5.0V +/- .25V, 3.3V+/-.25V, 2.7V+/-.25V

	XC3XXX	XC4XXXE	XC4XXXL	XC4XXXXLA
Period:		Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	1	3	1	2
Combined Completed Lots:	1	3	1	2
Failures:	0	0	0	0
Device on test:	36	45	12	36
Mean Test Hours/Device:	300	127	300	200
Total Device Hours:	10,800	5,700	3,600	7,200

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Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

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

	XC4XXXXV	XCVXXX	XCSXXXL	XCVXXXE
Period:		Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	1	11	2	7
Combined Completed Lots:	1	11	2	7
Failures:	0	0	0	0
Device on test:	12	196	49	207
Mean Test Hours/Device:	300	172	129	100
Total Device Hours:	3,600	33,700	6,300	20,742

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Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC3XXX Microcircuit Group**
Package Type:	**PLCC-68**
Test Condition:	**T = 130C, R.H. = 85%**
Bias Voltage:	**5.0V +/- .25V**

	XC3030/A	XC3XXX
Period:	**Oct. 1, 1998 to Oct. 1, 2000**	
Combined Started Lot:	**1**	**1**
Combined Completed Lots:	**1**	**1**
Failures:	**0**	**0**
Device on test:	**36**	**36**
Mean Test Hours/Device:	**300**	**300**
Total Device Hours:	**10,800**	**10,800**

Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

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

	XC4013E	XC4025E	XC4XXXE
Period:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Started Lot:	**1**	**2**	**3**
Combined Completed Lots:	**1**	**2**	**3**
Failures:	**0**	**0**	**0**
Device on test:	**22**	**23**	**45**
Mean Test Hours/Device:	**100**	**152**	**127**
Total Device Hours:	**2,200**	**3,500**	**5,700**

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Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC4XXXL Microcircuit Group**
Package Type:	**PQFP-208**
Test Condition:	**T = 130C, R.H. = 85%**
Bias Voltage:	**3.3V +/- .25V**

	XC4020XL	XC4XXXL
Period:	**Oct. 1, 1998 to Oct. 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:	**XC4XXXXLA Microcircuit Group**
Package Type:	**HQFP-240**
Test Condition:	**T = 130C, R.H. = 85%, 3ATM**
Bias Voltage:	**3.3V +/- .25V**

	XC4036XLA	XC4XXXXLA
Period:	**Oct. 1, 1998 to Oct. 1, 2000**	
Combined Started Lot:	**2**	**2**
Combined Completed Lots:	**2**	**2**
Failures:	**0**	**0**
Device on test:	**36**	**36**
Mean Test Hours/Device:	**200**	**200**
Total Device Hours:	**7,200**	**7,200**

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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:	**Oct. 1, 1998 to Oct. 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%**
Bias Voltage:	**2.7V +/- .25V**

	XCV200	XCV300	XCV800	XCV1000	XCVXXX
Period:	**Oct. 1, 1998 to Oct. 1, 2000**				
Combined Started Lot:	**2**	**3**	**3**	**3**	**11**
Combined Completed Lots:	**2**	**3**	**3**	**3**	**11**
Failures:	**0**	**0**	**0**	**0**	**0**
Device on test:	**42**	**71**	**59**	**24**	**196**
Mean Test Hours/Device:	**150**	**168**	**175**	**217**	**172**
Total Device Hours:	**6,300**	**11,900**	**10,300**	**5,200**	**33,700**

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Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XCSXXXL Microcircuit Group**
Package Type:	**CS-280**
Test Condition:	**T = 130C, R.H. = 85%, 3ATM**
Bias Voltage:	**3.3V +/- .3V**

	XCS40XL	XCSXXXL
Period:	**Oct. 1, 1998 to Oct. 1, 2000**	
Combined Started Lot:	**2**	**2**
Combined Completed Lots:	**2**	**2**
Failures:	**0**	**0**
Device on test:	**49**	**49**
Mean Test Hours/Device:	**129**	**129**
Total Device Hours:	**6,300**	**6,300**

Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XCVXXXE Microcircuit Group**
Package Type:	**BGA-560,728, FG900, 1156, PQFP-240**
Test Condition:	**T = 130C, R.H. = 85%**
Bias Voltage:	**1.9V +/- .1V**

	XCV300E	XCV1000E	XCV1600E
Period:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Started Lot:	**1**	**2**	**1**
Combined Completed Lots:	**1**	**2**	**1**
Failures:	**0**	**0**	**0**
Device on test:	**76**	**43**	**22**
Mean Test Hours/Device:	**100**	**101**	**100**
Total Device Hours:	**7,600**	**4,342**	**2,200**

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Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XCVXXXE Microcircuit Group**
Package Type:	**BGA-560,728, FG900, 1156, PQFP-240**
Test Condition:	**T = 130C, R.H. = 85%**
Bias Voltage:	**1.9V +/- .1V**

	XCV2000E	XCV812E	XCVXXXE
Period:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Started Lot:	**2**	**1**	**7**
Combined Completed Lots:	**2**	**1**	**7**
Failures:	**0**	**0**	**0**
Device on test:	**44**	**22**	**207**
Mean Test Hours/Device:	**100**	**100**	**100**
Total Device Hours:	**4,400**	**2,200**	**20,742**

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The Coolrunner Products

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**

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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 Analysis: **F/A(1)-Gate oxide defect** **F/A(2)-1-Idd failure, 1-single bit charge loss**

Failure Rate (60% C.L.) in FITS @ Tj=70C:	**61**
Failure Rate (60% C.L.) in FITS @ Tj=55C:	**35**
Failure Rate (60% C.L.) in FITS @ Tj=25C:	**3**

Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XCR3XXXXL**
Package Type:	**TQ144**
Actual Temperature:	**145C**
Actual Voltage:	**3.6V**
Assumed Activation Energy:	**0.7 ev @ C.L. = 60%**

	XCR3256XL	XCR3064XL	XCR3128XL	XCR3XXXXL
Combined Lots:	1	1	1	3
Failures:	1	0	0	1
Device on test:	78	77	78	233
Actual device hours:	78,732	121,680	82,524	282,936
Mean :	1,009	1,560	1,058	1,209
Equivalent device hours @ Tj=70C:	5,508,357	8,513,144	5,773,658	19,795,158
Equivalent device hours @ Tj=55C:	16,264,439	25,136,628	17,047,790	58,448,857
Equivalent device hours @ Tj=25C:	1.96E+08	3.04E+08	2.06E+08	7.07E+08

Failure Analysis: F/A00001(1)-INC

Failure Rate (60% C.L.) in FITS @ Tj=70C:	**102**
Failure Rate (60% C.L.) in FITS @ Tj=55C:	**35**
Failure Rate (60% C.L.) in FITS @ Tj=25C:	**3**

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Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XCR3960, XCR3(5)128, XCR3064A
Package Type: BGA492, PC84, CP56
Test Condition: T = 130C, R.H. = 85%,
Bias Voltage: 3.6V, 5.5V

	XCR3960	XCR3(5)128	XCR3064A	XCRXXX
Combined Started Lot:	3	1	1	3
Combined Completed Lots:	3	1	1	3
Failures:	0	1	0	1
Device on test:	105	77	44	226
Mean Test Hours/Device:	96	96	100	97
Total Device Hours:	10,080	7,392	4,400	21,872
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, XCR3(5)128, XCR22(L)V10
Package Type: BGA-492, TQ-44, LQ-128, TQ100, PLCC-44,84, PQFP-100 TQFP-100, CP-56, PC-28
Test Condition: T = -55C/+125C (Air to Air)
T= -65C/+150C (Air to Air)

	XCR3960	XCR5064	XCR3(5)128
Combined Started Lot:	3	2	7
Combined Completed Lots:	3	2	7
Failures:	0	0	1
Device on test:	89	154	614
Mean Test Cycles/Device:	1,000	1,000	475
Total Device Cycles:	89,000	154,000	291,600
Failure Analysis:			F/A(1)-Single bit charge loss

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

Technology: Si Gate CMOS
Device Type: XCR3960, XCR5064, XCR3(5)128, XCR22(L)V10
Package Type: BGA-492, TQ-44, LQ-128, TQ100, PLCC-44,84, PQFP-100
Test Condition: TQFP-100, CP-56, PC-28
T = -55C/+125C (Air to Air)
T= -65C/+150C (Air to Air)

	XCR3(5)064	XCR22(L)V10	XCRXXXX
Combined Started Lot:	4	1	17
Combined Completed Lots:	4	1	17
Failures:	0	0	0
Device on test:	301	152	1,310
Mean Test Cycles/Device:	1,000	500	696
Total Device Cycles:	301,000	76,000	911,600
Failure Analysis:			

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

Technology: Si Gate CMOS
Device Type: XCR3256XL, XCR3128XL
Package Type: TQ144, CS-144
Test Condition: T = -65C/+150C (Air to Air)
T = -55C/+125C (Air to Air)

	XCR3256XL	XCR3128XL	XCRXXXXXL
Combined Started Lot:	1	1	1
Combined Completed Lots:	1	1	1
Failures:	0	0	0
Device on test:	74	76	74
Mean Test Cycles/Device:	1,060	1,000	1,060
Total Device Cycles:	78,440	76,000	78,440
Failure Analysis:			

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	XCRXXXX
Combined Started Lot:	3	7	7	3	20
Combined Completed Lots:	3	7	7	3	20
Failures:	4	0	0	0	0
Device on test:	101	533	607	231	1,472
Mean Test Hour s/Device:	166	217	123	168	167
Total Device Hours:	16,752	115,584	74,760	38,808	245,904
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:	

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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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The CPLD & EPROM Products

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	XC17XXL
Period:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Lots:	**2**	**4**	**8**
Failures:	**0**	**0**	**1**
Device on test:	**123**	**365**	**519**
Actual device hours:	**127,704**	**332,700**	**715,912**
Mean :	**1,038**	**912**	**1,379**
Equivalent device hours @ Tj=125C:	**286,749**	**747,052**	**1,607,525**
Equivalent device hours @ Tj=55C:	**10,578,403**	**27,559,315**	**59,302,809**
Equivalent device hours @ Tj=25C:	**8.34E+07**	**2.17E+08**	**4.68E+08**
Failure Rate (60% C.L.) in FITS @ Tj=55C:	**87**	**33**	**34**
Failure Rate (60% C.L.) in FITS @ Tj=25C:	**11**	**4**	**4**
Failure Analysis:			

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Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC17SXX/XL, XC17XXXXL**
Package Type:	**Various**
Actual Temperature:	**145C**
Actual Voltage:	**5.7V +/-0.25, 3.3V+/-0.3V**
Assumed Activation Energy:	**0.58 ev for Eprom;**

	XC17SXX	XC17SXXXL
Period:	**Oct. 1, 1998 to Oct. 1, 2000**	
Combined Lots:	**10**	**5**
Failures:	**1**	**1**
Device on test:	**759**	**411**
Actual device hours:	**852,166**	**531,299**
Mean :	**1,123**	**1,293**
Equivalent device hours @ Tj=125C:	**1,913,472**	**1,192,991**
Equivalent device hours @ Tj=55C:	**70,589,454**	**44,010,329**
Equivalent device hours @ Tj=25C:	**5.59E+08**	**3.47E+08**
Failure Rate (60% C.L.) in FITS @ Tj=55C:	**29**	**46**
Failure Rate (60% C.L.) in FITS @ Tj=25C:	**4**	**6**
Failure Analysis:		

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Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC18XX, 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**

	XC18XX	XC95XXX	XC95XXXXL
Period:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Lots:	**2**	**16**	**6**
Failures:	**0**	**0**	**0**
Device on test:	**136**	**923**	**454**
Actual device hours:	**218,320**	**744,261**	**523,237**
Mean :	**1,605**	**806**	**1,153**
Equivalent device hours @ Tj=125C:	**490,221**	**1,975,630**	**1,388,925**
Equivalent device hours @ Tj=55C:	**18,084,610**	**153,749,726**	**18,090,186**
Equivalent device hours @ Tj=25C:	**1.43E+08**	**1.86E+09**	**1.31E+09**
Failure Rate (60% C.L.) in FITS @ Tj=55C:	**51**	**6**	**8**
Failure Rate (60% C.L.) in FITS @ Tj=25C:	**6**	**0.5**	**0.7**
Failure Analysis:			

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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:	**Oct. 1, 1998 to Oct. 1, 2000**	
Combined Lots:	**2**	**2**
Failures:	**0**	**0**
Device on test:	**123**	**123**
Actual device hours:	**127,704**	**127,704**
Mean :	**1,038**	**1,038**
Equivalent device hours @ Tj=125C:	**286,749**	**286,749**
Equivalent device hours @ Tj=55C:	**10,578,403**	**10,578,403**
Equivalent device hours @ Tj=25C:	**8.34E+07**	**8.34E+07**
Failure Analysis:		
Failure Rate (60% C.L.) in FITS @ Tj=55C:		**87**
Failure Rate (60% C.L.) in FITS @ Tj=25C:		**11**

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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:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Lots:	**6**	**2**	**8**
Failures:	**1**	**0**	**1**
Device on test:	**365**	**154**	**519**
Actual device hours:	**522,000**	**193,912**	**715,912**
Mean :	**1,430**	**1,259**	**1,379**
Equivalent device hours @ Tj=125C:	**1,172,110**	**435,414**	**1,607,525**
Equivalent device hours @ Tj=55C:	**43,240,044**	**16,062,765**	**59,302,809**
Equivalent device hours @ Tj=25C:	**3.41E+08**	**1.27E+08**	**4.68E+08**
Failure Analysis:	**F/A 99111(1)-FANC**		
Failure Rate (60% C.L.) in FITS @ Tj=55C:			**34**
Failure Rate (60% C.L.) in FITS @ Tj=25C:			**4**

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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%**

	XC17S05	XC17S20	X C17S30	XC17S40*	XC17SXX
Period:	**Oct. 1, 1998 to Oct. 1, 2000**				
Combined Lots:	**1**	**1**	**3**	**5**	**10**
Failures:	**0**	**0**	**0**	**1**	**1**
Device on test:	**106**	**106**	**258**	**289**	**759**
Actual device hours:	**108,438**	**108,438**	**265,290**	**370,000**	**852,166**
Mean :	**1,023**	**1,023**	**1,028**	**1,280**	**1,123**
Equivalent device hours @ Tj=125C:	**243,489**	**243,489**	**595,688**	**830,806**	**1,913,472**
Equivalent device hours @ Tj=55C:	**8,982,498**	**8,982,498**	**21,975,385**	**30,649,073**	**70,589,454**
Equivalent device hours @ Tj=25C:	**7.08E+07**	**7.08E+07**	**1.73E+08**	**2.42E+08**	**5.57E+08**

Failure Analysis: **F/A99111(1)-FANC**

Failure Rate (60% C.L.) in FITS @ Tj=55C: 29
Failure Rate (60% C.L.) in FITS @ Tj=25C: 4

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Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

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

	XC17S10XL	XC17S40XL	XC17S150XL	XC17SXXXL
Period:	**Oct. 1, 1998 to Oct. 1, 2000**			
Combined Started Lots:	**1**	**1**	**3**	**5**
Failures:	**0**	**0**	**1**	**1**
Device on test:	**107**	**107**	**197**	**411**
Actual device hours:	**109,140**	**109,461**	**312,698**	**531,299**
Mean :	**1,020**	**1,023**	**1,587**	**1,293**
Equivalent device hours @ Tj=125C:	**245,0665**	**245,786**	**702,139**	**1,192,991**
Equivalent device hours @ Tj=55C:	**9,040,648**	**9,067,238**	**25,902,443**	**44,010,329**
Equivalent device hours @ Tj=25C:	**7.13E+07**	**7.15E+07**	**2.04E+08**	**3.47E+08**
Failure Analysis:			**F/A 99111(1)-FANC**	

Failure Rate (60% C.L.) in FITS @ Tj=55C: 46
Failure Rate (60% C.L.) in FITS @ Tj=25C: 6

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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:	**Oct. 1, 1998 to Oct. 1, 2000**	
Combined Lots:	**4**	**4**
Failures:	**0**	**0**
Device on test:	**365**	**365**
Actual device hours:	**332,700**	**332,700**
Mean :	**912**	**912**
Equivalent device hours @ Tj=125C:	**747,052**	**747,052**
Equivalent device hours @ Tj=55C:	**27,559,315**	**27,559,315**
Equivalent device hours @ Tj=25C:	**2.17E+08**	**2.17E+08**
Failure Analysis:		
Failure Rate (60% C.L.) in FITS @ Tj=55C:		**33**
Failure Rate (60% C.L.) in FITS @ Tj=25C:		**7**

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Reliability Testing Summary
High Temperature Life Test
Qualification & Monitor Combined

Technology:	**Si Gate CMOS**
Device Type:	**XC18VXX Microcircuit Group**
Package Type:	**VQF-44**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**3.3V +/-0.3V**
Assumed Activation Energy:	**0.58 ev @ C.L. = 60%**

	XC18V04	XC18VXX
Period:	**Oct. 1, 1998 to Oct. 1, 2000**	
Combined Lots:	**2**	**2**
Failures:	**0**	**0**
Device on test:	**136**	**136**
Actual device hours:	**218,320**	**218,320**
Mean :	**1,605**	**1,605**
Equivalent device hours @ Tj=125C:	**490,221**	**490,221**
Equivalent device hours @ Tj=55C:	**18,084,610**	**18,084,610**
Equivalent device hours @ Tj=25C:	**1.43E+08**	**1.43E+08**
Failure Analysis:		
Failure Rate (60% C.L.) in FITS @ Tj=55C:		**51**
Failure Rate (60% C.L.) in FITS @ Tj=25C:		**6**

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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
Period:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Lots:	**3**	**2**	**6**
Failures:	**0**	**0**	**0**
Device on test:	**147**	**126**	**334**
Actual device hours:	**89,127**	**133,473**	**267,150**
Mean :	**606**	**1,059**	**800**
Equivalent device hours @ Tj=125C:	**236,586**	**354,302**	**709,146**
Equivalent device hours @ Tj=55C:	**18,411,836**	**27,572,823**	**55,187,789**
Equivalent device hours @ Tj=25C:	**2.23E+08**	**3.33E+08**	**6.67E+08**
Failure Analysis:			

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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%**

	XC9572	XC95216	XC95288	XC95XXX
Period:	**Oct. 1, 1998 to Oct. 1, 2000**			
Combined Lots:	**2**	**2**	**1**	**16**
Failures:	**0**	**0**	**0**	**0**
Device on test:	**120**	**120**	**76**	**923**
Actual device hours:	**86,685**	**90,990**	**76,836**	**744,261**
Mean :	**722**	**758**	**1,011**	**806**
Equivalent device hours @ Tj=125C:	**230,104**	**241,532**	**203,960**	**1,975,630**
Equivalent device hours @ Tj=55C:	**17,907,368**	**18,796,694**	**15,872,764**	**153,749,276**
Equivalent device hours @ Tj=25C:	**2.17E+08**	**2.27E+08**	**1.92E+08**	**1.86E+09**
Failure Analysis:				
Failure Rate (60% C.L.) in FITS @ Tj=55C:				**6**
Failure Rate (60% C.L.) in FITS @ Tj=25C:				**0.5**

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Reliability Testing Summary
High Temperature Operating Life
Qualification & Monitor

Technology:	**Si Gate CMOS**
Device Type:	**XC95XXXL Microcircuit Group**
Package Type:	**PQFP-160, 208, HQFP-208, PLCC-44**
Actual Temperature:	**145C +8C/-0C**
Actual Voltage:	**3.3V +/-0.3V**
Assumed Activation Energy:	**0.7 ev @ C.L. = 60%**

	XC9536XL	XC95144XL	XC95288XL	XC95XXXL
Period:	**Oct. 1, 1998 to Oct. 1, 2000**			
Combined Lots:	**1**	**2**	**3**	**6**
Failures:	**0**	**0**	**0**	**0**
Device on test:	**76**	**151**	**227**	**454**
Actual device hours:	**233,016**	**111,253**	**178,968**	**523,237**
Mean :	**3,066**	**737**	**788**	**1,153**
Equivalent device hours @ Tj=125C:	**618,538**	**295,319**	**475,068**	**1,388,925**
Equivalent device hours @ Tj=55C:	**48,136,395**	**22,982,621**	**36,971,171**	**18,090,186**
Equivalent device hours @ Tj=25C:	**5.82E+08**	**2.78E+08**	**4.47E+08**	**1.31E+09**
Failure Analysis:				
Failure Rate (60% C.L.) in FITS @ Tj=55C:				**8**
Failure Rate (60% C.L.) in FITS @ Tj=25C:				**0.7**

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

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

	XC17XX/L	XC17SXX	XC17XXE
Period:	Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	2	3	1
Combined Completed Lots:	2	3	1
Failures:	0	0	0
Device on test:	121	135	45
Mean Test Hour s/Device:	1,074	1,048	1,004
Total Device Hours:	129,913	141,525	45,180

XILINX®

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

Technology: Si Gate CMOS
Device Type: XC18VXX, XC95XXX, XC95XXXXL
Package Type: Various
Test Condition: T=85C, R.H.=85%
Bias Voltages: 5.0V +/- .25V, 3.3V +/-.3V

	XC18VXX	XC95XXX	XC95XXXXL
Period:	Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	2	10	2
Combined Completed Lots:	2	10	2
Failures:	0	0	0
Device on test:	134	543	100
Mean Test Hour s/Device:	1,070	958	1,128
Total Device Hours:	143,402	519,986	112,844

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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:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Started Lot:	**1**	**1**	**2**
Combined Completed Lots:	**1**	**1**	**2**
Failures:	**0**	**0**	**0**
Device on test:	**45**	**76**	**121**
Mean Test Hour s/Device:	**1,117**	**1,048**	**1,074**
Total Device Hours:	**50,265**	**79,648**	**129,913**

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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**

	XC17256E	XC17XXXE
Period:	**Oct. 1, 1998 to Oct. 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:	**1,024**	**1,024**
Total Device Hours:	**46,080**	**46,080**

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

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

	XC17S20	XC17S30	XC17S40	XC17SXX
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	1	1	1	3
Combined Completed Lots:	1	1	1	3
Failures:	0	0	0	0
Device on test:	45	45	45	135
Mean Test Hour s/Device:	1,004	1,024	1,117	1,048
Total Device Hours:	45,180	46,080	50,265	141,525

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

Technology:	**Si Gate CMOS**
Device Type:	**XC18VXX Microcircuit Group**
Package Type:	**VQFP-44, SO-20**
Test Condition:	**T = 85C, R.H. = 85%**
Bias Voltages:	**3.3V +/- .3V**

	XC18V01	XC18V04	XC18VXX
Period:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Started Lot:	**1**	**1**	**2**
Combined Completed Lots:	**1**	**1**	**2**
Failures:	**0**	**0**	**0**
Device on test:	**74**	**60**	**134**
Mean Test Hour s/Device:	**1,123**	**1,005**	**1,070**
Total Device Hours:	**83,102**	**60,300**	**143,402**

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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

	XC95108	XC95144	XC9536	XC95216	XC95XXX
Period:	Oct. 1, 1998 to Oct. 1, 2000				
Combined Started Lot:	1	1	7	1	10
Combined Completed Lots:	1	1	7	1	10
Failures:	0	0	0	0	0
Device on test:	76	76	346	45	543
Mean Test Hour s/Device:	1,071	1,000	897	1,163	958
Total Device Hours:	81,396	76,000	310,255	52,335	519,986
Failure Analysis Number:					

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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:	Oct. 1, 1998 to Oct. 1, 2000	
Combined Started Lot:	2	2
Combined Completed Lots:	2	2
Failures:	0	0
Device on test:	100	100
Mean Test Hour s/Device:	1,128	1,128
Total Device Hours:	112,844	112,844
Failure Analysis Number:		

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Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

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

	XC17XX	XC17XXL	XC17XXE	XC17SXX	XC95XXX
Period:	Oct. 1, 1998 to Oct. 1, 2000				
Combined Started Lot:	1	1	1	3	32
Combined Completed Lots:	1	1	1	3	32
Failures:	0	0	0	0	0
Device on test:	75	45	44	134	1,948
Mean Test Hour s/Device:	96	96	186	156	135
Total Device Hours:	72,000	4,320	8,184	20,874	262,560

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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:	Oct. 1, 1998 to Oct. 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:	7,200	7,200
Failure Analysis Number:		

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Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XXL Microcircuit Group
Package Type: PD-8
Test Condition: T = 121C; 2 atm. sat. steam

	XC1701L	XC17XXL
Period:	Oct. 1, 1998 to Oct. 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:		

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Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

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

	XC17256E	XC17XXXE
Period:	Oct. 1, 1998 to Oct. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	44	44
Mean Test Hour s/Device:	186	186
Total Device Hours:	8,184	8,184
Failure Analysis Number:		

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Reliability Testing Summary-Packages
Pressure Pot
Qualification & Monitor Combined

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

	XC17S20	XC17S30	XC17S40	XC17SXX
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	1	1	1	3
Combined Completed Lots:	1	1	1	3
Failures:	0	0	0	0
Device on test:	45	44	45	134
Mean Test Hour s/Device:	186	186	96	156
Total Device Hours:	8,370	8,184	4,320	20,874
Failure Analysis Number:				

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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, TQFP-100, PQFP-100,160
Test Condition: T = 121C; 2 atm. sat. steam

	XC9536	XC9572	XC95144	XC95216	XC95XXX
Period:	Oct. 1, 1998 to Oct. 1, 2000				
Combined Started Lot:	5	25	1	1	32
Combined Completed Lots:	5	25	1	1	32
Failures:	0	0	0	0	0
Device on test:	177	1,650	76	45	1,948
Mean Test Hour s/Device:	127	135	168	96	135
Total Device Hours:	22,464	223,008	12,768	4,320	262,560
Failure Analysis Number:					

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

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

	XC17XX	XC17XXL	XC17XXXE
Period:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Started Lot:	**2**	**2**	**1**
Combined Completed Lots:	**2**	**2**	**1**
Failures:	**0**	**0**	**0**
Device on test:	**91**	**118**	**45**
Mean Test Cycles/Device:	**965**	**1,042**	**1,081**
Total Device Cycles:	**87,835**	**122,960**	**48,645**
Failure Analysis Number:			

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

Technology: Si Gate CMOS
Device Type: XC17SXX, XC18VXX, XC95XXX & XC95XXXXL
Package Type: Various
Test Condition: T = -65C / +150C (Air to Air)
T = -55C / +125C (Air to Air) for BGA

	XC17SXX	XC18VXX	XC95XXX	XC95XXXL
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	3	2	32	5
Combined Completed Lots:	3	2	32	5
Failures:	0	0	0	0
Device on test:	135	132	1,728	344
Mean Test Cycles/Device:	1,061	728	958	1,069
Total Device Cycles:	143,280	96,144	1,722,490	367,824
Failure Analysis Number:				

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

Technology: Si Gate CMOS
Device Type: XC17XX Microcircuit Group
Package Type: SOIC-20
Test Condition: T = -65C/+150C (Air to Air)

	XC1701	XC17XX
Period:	Oct. 1, 1998 to Oct. 1, 2000	
Combined Started Lot:	2	2
Combined Completed Lots:	2	2
Failures:	0	0
Device on test:	91	91
Mean Test Cycles/Device:	965	965
Total Device Cycles:	87,835	87,835
Failure Analysis Number:		

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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, VQFP-44
Test Condition: T = -65C/+150C (Air to Air)

	XC1701L	XC1702L	XC17XXL
Period:	Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	1	1	2
Combined Completed Lots:	1	1	2
Failures:	0	0	0
Device on test:	45	73	118
Mean Test Cycles/Device:	1,021	1,055	1,042
Total Device Cycles:	45,945	77,015	122,960
Failure Analysis Number:			

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

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

	XC17256E	XC17XXXE
Period:	Oct. 1, 1998 to Oct. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	45	45
Mean Test Cycles/Device:	1,081	1,081
Total Device Cycles:	48,645	48,645
Failure Analysis Number:		

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

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

	XC17S20	XC17S30	XC17S40	XC17SXX
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	1	1	1	3
Combined Completed Lots:	1	1	1	3
Failures:	0	0	0	0
Device on test:	45	45	45	135
Mean Test Cycles/Device:	1,082	1,081	1,021	1,061
Total Device Cycles:	48,690	48,645	45,945	143,280
Failure Analysis Number:				

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

Technology: Si Gate CMOS
Device Type: XC18VXX Microcircuit Group
Package Type: VQFP-44, SOIC-20
Test Condition: T = -65C/+150C (Air to Air)

	XC18V01	XC18V04	XC18VXX
Period:	Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	1	1	2
Combined Completed Lots:	1	1	2
Failures:	0	0	0
Device on test:	72	60	152
Mean Test Cycles/Device:	502	1,019	728
Total Device Cycles:	36,144	61,140	96,144
Failure Analysis Number:			

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

Technology: Si Gate CMOS
Device Type: XC95XXX Microcircuit Group
Package Type: PQFP-100,160, PLCC-44, CS-48, 144, VQFP-44
TQFP-100, BGA-352
Test Condition: T = -65C/+150C (Air to Air)
T = -55C / +125C (Air to Air) for CS* & BGA*

	XC95108	XC9536*	XC9536	XC95216
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	4	3	6	1
Combined Completed Lots:	4	3	6	1
Failures:	0	0	0	0
Device on test:	172	58	370	45
Mean Test Cycles/Device:	971	1,000	1,008	546
Total Device Cycles:	167,092	58,000	373,102	24,570
Failure Analysis Number:				

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

Technology: Si Gate CMOS
Device Type: XC95XXX Microcircuit Group
Package Type: PQFP-100,160, PLCC-44, CS-48, 144, VQFP-44
TQFP-100, BGA-352
Test Condition: T = -65C/+150C (Air to Air)
T = -55C / +125C (Air to Air) for CS* & BGA*

	XC9572	XC95144*	XC95288*	XC95XXX
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	16	1	1	32
Combined Completed Lots:	16	1	1	32
Failures:	0	0	0	0
Device on test:	1,032	76	45	1,798
Mean Test Cycles/Device:	948	1,011	1,000	958
Total Device Cycles:	977,890	76,836	45,000	1,722,490
Failure Analysis Number:				

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

Technology: Si Gate CMOS
Device Type: XC95XXXL Microcircuit Group
Package Type: PQFP-160, 208, TQFP144, CS-144-280
Test Condition: T = -65C/+150C (Air to Air)

	XC95144XL	XC95144XL*	XC95288XL	XC95288XL*	XC95XXXXL
Period:		Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	2	1	1	1	5
Combined Completed Lots:	2	1	1	1	5
Failures:	0	0	0	0	0
Device on test:	151	41	76	76	344
Mean Test Cycles/Device:	1,145	1,012	1,018	1,000	1,069
Total Device Cycles:	172,964	41,492	77,368	76,000	367,824
Failure Analysis Number:					

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Reliability Testing Summary-Packages
Hast
Qualification & Monitor Combined

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

XC95XXX

Period:	**Oct. 1, 1998 to Oct. 1, 2000**
Combined Started Lot:	**4**
Combined Completed Lots:	**4**
Failures:	**0**
Device on test:	**95**
Mean Test Hours/Device:	**288**
Total Device Hours:	**27,400**

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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%**
Bias Voltage:	**5.0V +/- .25V**

	XC9572	XC95216	XC95XXX
Period:	**Oct. 1, 1998 to Oct. 1, 2000**		
Combined Started Lot:	**3**	**1**	**4**
Combined Completed Lots:	**3**	**1**	**4**
Failures:	**0**	**0**	**0**
Device on test:	**80**	**15**	**95**
Mean Test Hours/Device:	**286**	**300**	**288**
Total Device Hours:	**22,900**	**4,500**	**27,400**

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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

	XC17XXXE	XC17XXL	XC17SXX	XC17SXXXL
Period:	Oct. 1, 1998 to Oct. 1, 2000			
Combined Started Lot:	2	6	3	1
Combined Completed Lots:	2	6	3	1
Failures:	0	0	0	0
Device on test:	285	512	418	138
Mean Test Hours/Device:	1,627	1,622	1,766	2,171
Total Device Hours:	463,712	830,442	738,091	299,598
Failure Analysis Number:				

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Reliability Testing Summary-Packages
Data Retention
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC18VXX, XC95XXX, XC95XXXXL Microcircuit Group
Package Type: Various
Test Condition: 150C

	XC18VXX	XC95XXX	XC95XXXXL
Period:	Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	1	7	1
Combined Completed Lots:	1	7	1
Failures:	0	0	0
Device on test:	60	589	22
Mean Test Hours/Device:	1,021	2,043	2,130
Total Device Hours:	61,260	1,203,548	46,860
Failure Analysis Number:			

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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:	Oct. 1, 1998 to Oct. 1, 2000	
Combined Started Lot:	2	2
Combined Completed Lots:	2	2
Failures:	0	0
Device on test:	285	285
Mean Test Hours/Device:	1,627	1,627
Total Device Hours:	463,712	463,712

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Reliability Testing Summary-Packages
Data Retention
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC17XXL Microcircuit Group
Package Type: PD-8, VQFP-44
Test Condition: 150C

	XC1701L	XC1704L	XC17XXL
Period:	Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	4	2	6
Combined Completed Lots:	4	2	6
Failures:	0	0	0
Device on test:	296	216	512
Mean Test Hours/Device:	1,793	1,388	1,622
Total Device Hours:	530,730	299,712	830,442

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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

	XC17S30	XC17S40	XC17SXX
Period:	Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	2	1	3
Combined Completed Lots:	2	1	3
Failures:	0	0	0
Device on test:	285	133	418
Mean Test Hours/Device:	1,627	2,063	1,766
Total Device Hours:	463,712	274,379	738,091

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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:	Oct. 1, 1998 to Oct. 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

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Reliability Testing Summary-Packages
Data Retention
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC18VXX Microcircuit Group
Package Type: VQFP-44
Test Condition: 150C

	XC18V04	XC18VXX
Period:	Oct. 1, 1998 to Oct. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	60	60
Mean Test Hours/Device:	1,021	1,021
Total Device Hours:	61,260	61,260

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Reliability Testing Summary-Packages
Data Retention
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC95XXX Microcircuit Group
Package Type: PLCC- 44, 84, PQFP-160, HQFP-208
Test Condition: 150C

	XC95108	XC9572	XC95216	XC9536	XC95XXX
Period:	Oct. 1, 1998 to Oct. 1, 2000				
Combined Started Lot:	3	1	1	2	7
Combined Completed Lots:	3	1	1	2	7
Failures:	0	0	0	0	0
Device on test:	196	107	105	181	589
Mean Test Hours/Device:	2,516	1,213	2,057	2,014	2,043
Total Device Hours:	493,071	129,791	215,985	364,701	1,203,548
Failure Analysis Number:					

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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:	Oct. 1, 1998 to Oct. 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:		

XILINX®

Reliability Testing Summary-Packages
Erase Cycling
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC18VXX Microcircuit Group
Package Type: PLCC- 44
Test Condition: 85C
Voltage: Vcc=3.0V, Vpp=9.0-9.5V

	XC18V04	XC18VXX
Period:	Oct. 1, 1998 to Oct. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	30	30
Mean Test Cycles/Device:	16,000	16,000
Total Device Cycles:	480,000	480,000

XILINX®

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:	Oct. 1, 1998 to Oct. 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

XILINX®

Reliability Testing Summary-Packages
Erase Cycling
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC95XXX Microcircuit Group
Package Type: PLCC- 84, PC44
Test Condition: 85C
Voltage: Vcc=5.0V, Vpp=12.0-12.5V

	XC9536	XC9572	XC95XXX
Period:	Oct. 1, 1998 to Oct. 1, 2000		
Combined Started Lot:	1	1	3
Combined Completed Lots:	1	1	3
Failures:	0	0	0
Device on test:	16	28	44
Mean Test Cycles/Device:	30,000	10,000	17,273
Total Device Cycles:	480,000	280,000	760,000

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Reliability Testing Summary-Packages
Erase Cycling
Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC95XXXXL Microcircuit Group
Package Type: PQFP-160
Test Condition: -40C
Voltage: Vcc=3.3V, Vpp=9.0-9.5V

	XC95144XL	XC95XXXXL
Period:	Oct. 1, 1998 to Oct. 1, 2000	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	22	22
Mean Test Cycles/Device:	19,546	19,546
Total Device Cycles:	430,000	430,000

XILINX®

Package Qualification & Monitor Program

Reliability Testing Summary
Package Qualification / Monitor
PD-8

Device Type: XC1701L, XC17256E
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	1	0	45	1,021	45,945
Pressure Pot	1	0	45	96	4,320
85/85	1	0	45	1,000	50,265
Solderability	2	0	6		
Resistance to Solvents	2	0	6		
Lead Fatigue	2	0	6		
Physical Dimension	2	0	10		

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

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Reliability Testing Summary
Package Qualification / Monitor
SOIC

Device Type: XC1701, XC18V01, XCR22V10
Package Type: SOIC-20, 24
Die Attach Material: Silver Epoxy
Molding Compound: EME6300H, MP8000-CH4

Reliability Test	Combined No.Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	3	0	163	761	123,979
Pressure Pot	2	0	148	132	19,464
85/85	1	0	74	1,123	83,102
Solderability	1	0	3		
Lead Fatigue	2	0	8		
Physical Dimension	2	0	10		
Resistance to Solvents	1	0	3		
Bond Pull	3	0	15		

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

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Reliability Testing Summary
Package Qualification / Monitor
TSOP

Device Type: XC17S20, 17256E, XCR22V10
Package Type: VO8, VO24
Die Attach Material: Silver Epoxy
Molding Compound: KMC 184-3, MP8000-CH4

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
85/85	2	0	90	1,014	91,260
Solderability	3	0	9		
Physical Dimension	5	0	25		
Resistance to Solvents	3	0	9		
Lead Fatigue	3	0	10		
Bond Pull	2	0	10		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
PLCC-44

Device Type: XC3030/A, XC9536, XC9572, XC1704L
Package Type: PLCC- 44
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	14	0	826	926	765,098
Pressure Pot	19	0	1,134	124	140,448
Hast	3	0	80	286	22,900
Solderability	2	0	6		
Resistance to Solvents	3	0	9		
Lead Fatigue	2	0	6		
Physical Dimension	2	0	10		
Bond Pull	3	0	13		
Die Shear	2	0	8		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
PLCC-68, 84

Device Type: XC3030/A, XC4005E, XC4006E, XC4010/XL
Package Type: PLCC- 68, 84
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	2	0	152	1,019	154,888
Pressure Pot	4	0	186	88	16,296
Hast	1	0	36	300	10,800
85/85	2	0	66	1,004	66,270
Solderability	3	0	9		
Resistance to Solvents	3	0	9		
Lead Fatigue	3	0	10		
Physical Dimension	3	0	15		
Bond Pull	2	0	10		
Adhesion to lead finish	1	0	4		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
PQFP-100

Device Type: XC3042/A, XC9572
Package Type: PQFP- 100
Die Attach Material: 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	4	0	304	1,014	308,332
Pressure Pot	4	0	302	150	45,264
85/85	1	0	45	1,117	50,265
Bond Pull	1	0	5		
Physical Dimension	1	0	5		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
PQFP-160

Device Type: XC95216, XC95144/XL, XC5206, XC4013E, XC4006
Package Type: PQFP- 160
Die Attach Material: 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	7	0	338	991	334,806
Pressure Pot	2	0	89	96	8,544
Hast	1	0	15	300	4,500
85/85	3	0	197	1,118	220,295
Die Shear	1	0	5		
Resistance to Solvents	1	0	3		
Bond Pull	1	0	5		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
PQFP-208

Device Type: XC4010E, XC4020XL, XCS30XL,XCS40XL, XC2S150 XC95288XL,
Package Type: PQFP- 208
Die Attach Material: 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	18	0	849	975	828,033
Pressure Pot	2	0	80	137	10,920
Hast	1	0	12	300	3,600
85/85	1	0	45	1,148	51,660
Solderability	2	0	6		
Resistance to Solvents	2	0	6		
Lead Fatigue	2	0	6		
Physical Dimension	2	0	10		
Salt Atmosphere	2	0	30		
Bond Pull	1	0	5		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
PQFP-240

Device Type: XC4013/E, XC4013XL, XC4025E, XC4010E
XCS30/XL, XCV100, XCV300, XCV300EXC2S150
Package Type: PQFP- 240
Die Attach Material: 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	13	0	618	1,012	625,526
Pressure Pot	9	0	399	105	42,024
Hast	6	0	170	135	23,000
85/85	6	0	268	1,003	268,832
Solderability	3	0	9		
Bond Pull	1	0	5		
Lead Fatigue	3	0	9		
Salt Atmosphere	2	0	30		
Mark Permaanency	5	0	15		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
TQFP

Device Type: XC3190/A, XC4010XL, XC9572, XC95144XL
XCS30XL, XCR3256XL, XCV100

Package Type: TQFP- 100, 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	558	1,029	574,025
Pressure Pot	7	0	420	157	65,736
85/85	2	0	71	1,054	74,869
Solderability	3	0	9		
Resistance to Solvents	4	0	12		
Lead Fatigue	3	0	10		
Physical Dimension	3	0	15		
Bond Pull	1	0	5		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
VQFP

Device Type: XC3030/A/L, XC4003E, XCS30XL, XC9536, XC1702L, XC5202, XC1804
Package Type: VQFP- 44, 64, 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	5	0	315	1,027	323,563
Pressure Pot	5	0	286	158	45,216
85/85	8	0	382	900	343,919
Resistance to Solvents	4	0	12		
Bond pull	1	0	5		
Lead Fatigue	4	0	12		
Physical Dimension	4	0	20		
Solderability	4	0	12		
Adhesion to lead finish	1	0	3		

Period: Oct. 1st, 1998 to Oct. April 2000

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
HQFP

Device Type: XC4020E, XC4013E, XC4028EX, XC4036XLA, XC4062XLA,XC4044XLA, XC4052XLA,XC4085XLA XC40150XV, XCV300, XCV800,XCV1000/E

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	14	1 **	910	1,009	918,122
Pressure Pot	6	0	237	116	27,576
Hast	8	0	146	179	26,200
85/85	2	0	89	1,007	89,629
Resistance to Solvents	3	0	9		
Lead Fatigue	3	0	9		
Physical Dimension	4	0	20		
Solderability	3	0	9		
Salt Atmosphere	2	0	30		
Bond Pull	2	0	10		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
PPGA

Device Type: XC3190/A
Package Type: PPGA-132, 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	2	0	90	96	8,640
85/85	2	0	89	1,005	89,441
Solderability	2	0	6		
Lead Fatigue	2	0	6		
Physical Dimension	2	0	10		
Bond Strength	1	0	5		
Die shear	1	0	5		

Period: Jan. 1st, 1997 to Oct. 1st, 2000

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
HTFP

Device Type: XC3090A, XC4010, XC4020XL, XC3090/A
Package Type: HT-144, 176, 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	4	0	242	655	158,592
Pressure Pot	3	0	137	96	13,152
85/85	3	0	166	1,022	169,662
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		

Period: Jan. 1st, 1996 to Oct. 1st, 2000

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
BGA-225, 256

Device Type: XC4013/XL/XLA, XC4020XL/XLA
Package Type: BGA-225, 256,
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	187	1,020	190,764
Pressure Pot	2	0	197	124	24,384
85/85	1	0	74	1,010	74,756
Ball Shear	1	0	5		
Salt Atmosphere	1	0	15		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
BGA-352

Device Type: XC4036XL,XC4028XL,XCV300, XC95288
Package Type: BGA-432
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	6	0	162	1,004	162,638
Pressure Pot	3	0	32	96	3,072
Salt Atmosphere	1	0	15		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
BGA-432

Device Type: XC4052XL, XC4062XL, XCV800, XCV600
Package Type: BGA- 432
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	4	0	110	1,007	110,792
Pressure Pot	2	0	72	96	6,912
85/85	1	0	16	1,166	18,656
Physical Dimension	1	0	5		
Ball Shear	1	0	5		
Bond Pull	1	0	5		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
BGA-560

Device Type: XC4062XL/XLA, XC4085XL/XLA, XC40125XV, XC40150XV, XCV800, XCV1000, XCV1000E, XCV2000E
Package Type: BGA-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	14	0	387	932	360,529
Pressure Pot	8	0	194	104	20,208
85/85	3	0	50	1,136	56,796
Hast	3	0	45	100	4,500
Resistance to Solvents	2	0	6		
Bond Pull	3	0	15		
Ball Shear	3	0	15		
Physical Dimension	1	0	5		
Salt Atmophere	2	0	18		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
BGA-728

Device Type: XCV1000E
Package Type: BGA-728
Die Attach Material: 8510AA
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	1	0	26	1,148	29,847
Pressure Pot	1	0	29	168	4,872
Hast	1	0	21	102	2,142
Bond Pull	1	0	5		
Ball Shear	1	0	5		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
CS-48

Device Type: XC9536
Package Type: CS-48,
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	3	0	58	1,000	58,000
Pressure Pot	4	0	132	132	18,144
85/85	3	0	195	1,054	205,549
Resistance to Solvents	1	0	3		
Physical Dimension	1	0	5		
Ball Shear	1	0	5		
Bond Pull	1	0	5		

Period: July 1st, 1998 to Oct. 1st, 2000

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Reliability Testing Summary
Package Qualification / Monitor
CS-144, 280

Device Type: XC95144, XC95288XL, XCV100,XCV200E, XCS40XL XCR3128XL,
Package Type: CS -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	3	0	179	1,034	185,106
Pressure Pot	3	0	179	152	27,120
Hast	1	0	27	148	4,000
85/85	2	0	119	1,044	124,375
Resistance to Solvents	3	0	11		
Physical Dimension	3	0	15		
Ball Shear	5	0	25		
Bond Pull	5	0	25		
Die Shear	1	0	4		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
FG-256

Device Type: XCV200, XCV50
Package Type: FG-256
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	165	1,031	170,062
Pressure Pot	3	0	148	133	19,680
Hast	2	0	42	150	6,300
Resistance to Solvents	1	0	3		
Physical Dimension	1	0	5		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
FG-456, 556

Device Type: XCV1000, XCV300E, XCV300
Package Type: FG-456, 556
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	6	0	108	1,032	111,478
Pressure Pot	1	0	22	168	3,696
Hast	1	0	8	300	2,400
Resistance to Solvents	1	0	3		
Physical Dimension	1	0	5		
Ball Shear	1	0	5		
Bond Pull	2	0	7		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
FG-676

Device Type: XCV800
Package Type: FG-676
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	1	0	22	1,000	22,000
Pressure Pot	1	0	22	96	2,112
Resistance to Solvents	1	0	3		
Ball Shear	1	0	5		
Bond Pull	1	0	5		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
FG-680

Device Type: XCV1000
Package Type: FG-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	1	0	34	1,000	34,000
Pressure Pot	1	0	31	96	2,976
Ball Shear	1	0	5		
Bond Pull	1	0	5		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
FG-900

Device Type: XCV1000E, XCV1600E, XCV812E
Package Type: FG-900
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	3	0	74	1,070	79,190
Hast	3	0	66	100	6,600
Pressure Pot	2	0	54	168	9,072
Resistance to Solvents	1	0	3		
Ball Shear	1	0	5		
Bond Pull	1	0	5		
Physical Dimension	1	0	5		

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

XILINX®

Reliability Testing Summary
Package Qualification / Monitor
FG-1156

Device Type: XCV1000E
Package Type: FG-1156
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	3	0	38	821	31,188
Hast	1	0	22	100	2,200
Pressure Pot	1	0	22	168	3,696
Resistance to Solvents	1	0	3		
Ball Shear	1	0	5		
Bond Pull	1	0	5		
Physical Dimension	1	0	5		

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

XILINX®

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

Code	Test	Combined Sample	Failures	Mean Hrs/Cycles Per Device	Total Device Hours
B2	Resistance to Solvents	102	0		
B3	Solderability	105	0		
B5	Bond Strength	102	0		
D1	Physical Dimension	75	0		
D2	Lead Integrity	21	0		
	Seal				
D3	Thermal Shock	105	0	15	1,575
	Temperature Cycle			100	10,500
	Seal				
	Visual Examination				
	End-Point Elect. Parametrics				
D4	Mechanical Shock	105	0		
	Vibration, Var. Freq.				
	Constant Accel.				
	Seal				
	Visual Examination				
	End-Point Elec. Para.				
D5	Salt Atmosphere	105	0		
	Seal				
	Visual Examination				
D6	Internal Water-Vapor Content	21	0		
D7	Adhesion of lead finish	21	0		

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

XILINX®

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	124	0		
B3	Solderability	129	0		
B5	Bond Strength	95	0		
D1	Physical Dimension	135	0		
D2	Lead Integrity	27	0		
	Seal				
D3	Thermal Shock	147	0	15	2,205
	Temperature Cycle			100	14,700
	Seal				
	Visual Examination				
	End-Point Elect.				
	Parametrics				
D4	Mechanical Shock	135	0		
	Vibration, Var. Freq.				
	Constant Accel.				
	Seal				
	Visual Examination				
	End-Point Elec. Para.				
D5	Salt Atmosphere	150	0		
	Seal				
	Visual Examination				
D6	Internal Water-Vapor Content	27	0		
D7	Adhesion of lead finish	27	0		

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

XILINX®

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	21	0		
B5	Bond Strength	31	0		
D1	Physical Dimension	60	0		
D2	Lead Integrity	30	0		
	Seal				
D3	Thermal Shock	105	0	15	1,575
	Temperature Cycle			100	10,500
	Seal				
	Visual Examination				
	End-Point Elect.				
	Parametrics				
D4	Mechanical Shock	105	0		
	Vibration, Var. Freq.				
	Constant Accel.				
	Seal				
	Visual Examination				
	End-Point Elec. Para.				
D5	Salt Atmosphere	105	0		
	Seal				
	Visual Examination				
D6	Internal Water-Vapor Content	15	0		
D7	Adhesion of lead finish	15	0		
D8	Lead Torque	20	0		

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

XILINX®

Reliability Testing Summary
Chip Scale (CC) Package Qualification / Monitor

Code	Test	Combined Sample	Failures	Mean Hrs/Cycles Per Device	Total Device Hours
B2	Resistance to Solvents	18	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: Oct. 1st, 1998 to Oct. 1st, 2000

XILINX®

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**
Pre-conditionning 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, 2000**				
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

XILINX®

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**
Pre-conditionning 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, 2000**		
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

XILINX®

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**
Pre-conditionning 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, 2000**			
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

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Reliability Testing Summary-Packages
EIAJ Temperature Soldering Heat Test

Technology:	**Si-Gate CMOS**
Device Type:	**XC5XXX Microcircuit Group**
Package Type:	**TQFP-176**
Assembly:	**Anam**
Pre-conditionning 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, 2000**	
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

XILINX®

Reliability Testing Summary-Packages
EIAJ Temperature Soldering Test

Technology:	**Si-Gate CMOS**
Device Type:	**XC17XXX Microcircuit Group**
Package Type:	**DD8, PLCC-20**
Assembly:	**AAPI**
Pre-conditionning 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, 2000**	
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

XILINX®

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**
Pre-conditionning 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, 2000**			
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

XILINX®

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, 2000**	
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

XILINX®

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, 2000**			
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

XILINX®

Board Level Reliability Test

FG676, FG680, FG860, & FG1156

XILINX®

2nd Level Reliability Test
Xilinx FG676, FG680, FG860, &FG1156

Package Details

Package	Size	I/O	Pitch	Ball Size	Pad Opening	Pad Type	Die Size	Substrate
FG860 (SBGA)	42.5x42.5	860	1.0	0.6	0.48	SMD	22.45x21.44x0.3	0.98 Thk, 3 Layer
FG1156 (PBGA)	35x35	1156	1.0	0.6	0.48	SMD	23.11x21.13x0.3	0.56 Thk, 4 Layer
FG676 (PBGA)	27x27	676	1.0	0.6	0.48	SMD	17.8x17.8x0.3	0.56 Thk, 4 Layer
FG680 (SBGA)	40x40	680	1.0	0.6	0.48	SMD	20.3x20.3x0.3	0.98 Thk, 3 Layer

All Dimensions in mm

Motherboard Design & Assembly Details

- 4 Layer, FR-4, 1.6mm Thick, OSP Finish
- 0.38mm Pad Diameter/0.53mm Solder Mask Opening (NSMD Pads)
- 0.20mm SS Laser Cut Stencil, 0.43mm Aperture Opening, No Clean Paste

Test Conditions

- TC1 : -40<>125^{o}C, 15 minutes ramps,15 minutes dwells, 1 cycle/hour
- TC2 : -55<>125^{o}C, 3 minutes ramps,12 minutes dwells, 2 cycles/hour
- TC3 : 0 <>100^{o}C, 10 minutes ramps, 5 minutes dwells, 2 cycles/hour

Failure Criteria

- Continuous Scanning of Daisy Chain Nets (Every 2 minutes)
- Threshold Resistance: 500 ohms
- **OPEN**: An Event with Resistance of Net > Threshold Resistance
- **FAIL**: At Least 2 OPENs within a Temperature Cycle
- Log 15 FAILURES for each Net

XILINX®

2nd Level Reliability Test

Xilinx FG676, FG680, FG860, &FG1156

- **Summary of Test Results**

Package	Test Condition	Cycles Completed	# Tested	# Failed	1st Failure (cycles)	Mean Life (cycles)
FG676	TC1	2112	32	27	1341	1830
FG676	TC2	2126	32	26	1434	1788
FG676	TC3	7029	32	4	5909*	N/A
FG680	TC1	5222	29	20	4219	4796
FG680	TC2	3960	32	16	2883	3891
FG680	TC3	6790	32	0	N/A	N/A
FG860	TC3	5044	32	0	N/A	N/A
FG1156	TC1	3108	32	30	1601	2386
FG1156	TC2	2507	48	32	1666	2256
FG1156	TC3	5044	32	0	N/A	N/A

* First failure

- **All Packages Passed at least 1000 cycles of TC1 & TC2 Conditions**
- **TC2 is more Damaging than TC1 for FG680 (Heat Slug Package), No Significant Difference for FG676 & FG1156 (PBGA Type Packages)**

2nd Level Reliability Test - FG676 (PBGA)

Package

Package	Size	I/O	Pitch	Ball Size	Pad Opening	Pad Type	Die Size	Substrate
FG676 (PBGA)	27x27	676	1.0	0.6	0.48	SMD	17.8x17.8x0.3	0.56 Thk, 4 Layer

All Dimensions in mm

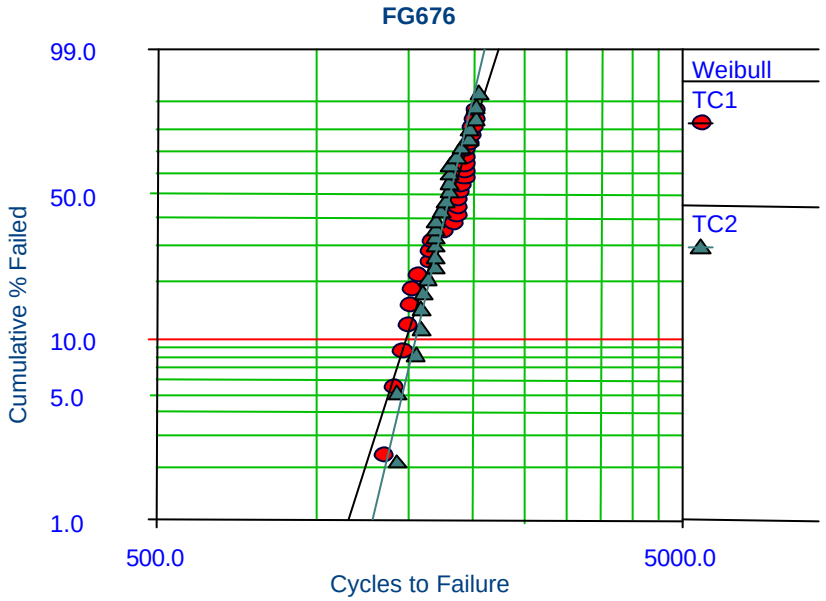
Motherboard

- 1.6mm Thick
- 0.38mm Pad NSMD

Test Data

- Failures Primarily Around Die Edge
- No Significant Difference Between TC1 and TC2 Results

Package	Test Condition	Cycles Completed	# Tested	# Failed	1st Failure (cycles)	Mean Life (cycles)
FG676	TC1	2112	32	27	1341	1830
FG676	TC2	2126	32	26	1434	1788
FG676	TC3	7029	32	4	5909*	N/A



$\beta 1=9.3, \eta 1=1896.5, \rho=1.0$

$\beta 2=12.6, \eta 2=1852.2, \rho=1.0$

2nd Level Reliability Test - FG680 (SBGA)

- **Package**

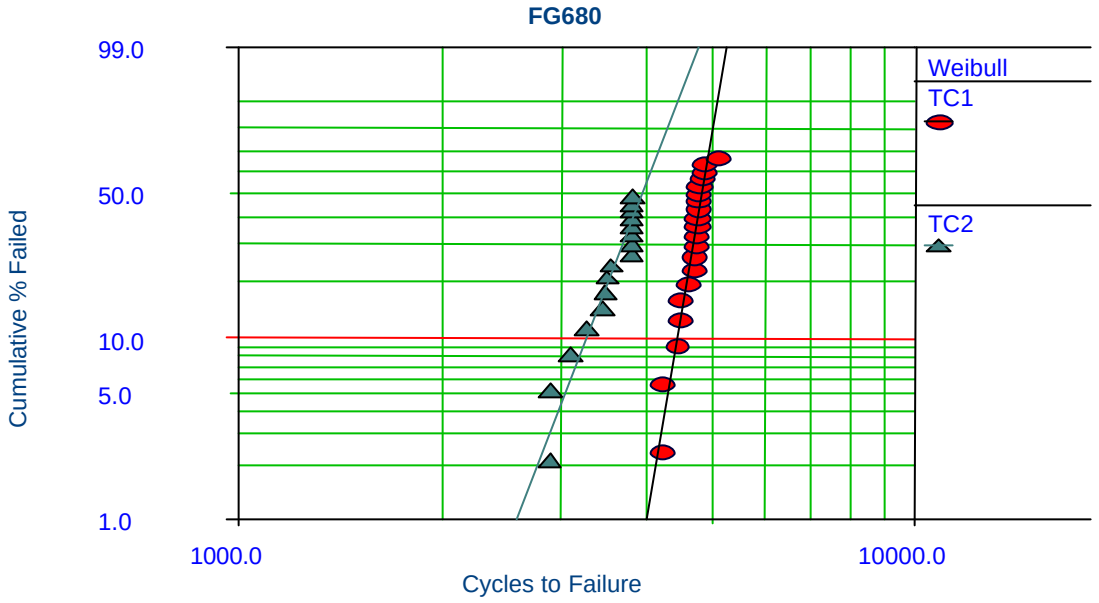
Package	Size	I/O	Pitch	Ball Size	Pad Opening	Pad Type	Die Size	Substrate
FG680 (SBGA)	40x40	680	1.0	0.6	0.48	SMD	20.3x20.3x0.3	0.98 Thk, 3 Layer

All Dimensions in mm

- **Motherboard**
  - 1.6mm Thick
  - 0.38mm Pad NSMD

- **Test Data**
  - TC2 is 1.25X More Damaging

Package	Test Condition	Cycles Completed	# Tested	# Failed	1st Failure (cycles)	Mean Life (cycles)
FG680	TC1	5222	29**	20	4219	4796
FG680	TC2	3960	32	16	2883	3891
FG680	TC3	6790	32	0	N/A	N/A



$\beta 1=22.6, \eta 1=4913.2, \rho=1.0$

$\beta 2=9.9, \eta 2=4092.2, \rho=1.0$

XILINX®

2nd Level Reliability Test - FG1156 (PBGA)

Package

Package	Size	I/O	Pitch	Ball Size	Pad Opening	Pad Type	Die Size	Substrate
FG1156 (PBGA)	35x35	1156	1.0	0.6	0.48	SMD	23.11x21.13x0.3	0.56 Thk, 4 Layer

All Dimensions in mm

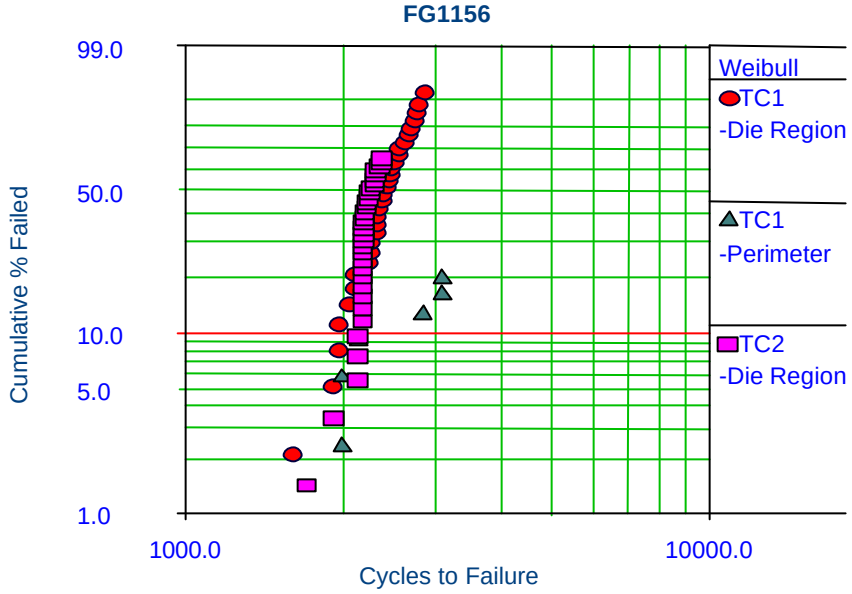
Motherboard

- 1.6mm Thick
- 0.38mm Pad NSMD

Package	Test Condition	Cycles Completed	# Tested	# Failed	1st Failure (cycles)	Mean Life (cycles)
FG1156	TC1	3108	32	30	1601	2386
FG1156	TC2	2507	48	32	1666	2256
FG1156	TC3	5044	32	0	N/A	N/A

Test Data

- 2 Separate Nets/Device
  - Inside the Die
  - Outside the Die
- Nets Inside the Die Failed First
  - Failures Primarily Underneath the Die
- No Significant Difference Between TC1 and TC2 Results



$\beta 1=8.9, \eta 1=2521.7, \rho=1.0$

$\beta 2=4.3, \eta 2=4268.4, \rho=0.9$

$\beta 3=19.4, \eta 3=2319.6, \rho=0.9$

2nd Level Reliability Test - FG860 (SBGA)

Package

Package	Size	I/O	Pitch	Ball Size	Pad Opening	Pad Type	Die Size	Substrate
FG860 (SBGA)	42.5x42.5	860	1.0	0.6	0.48	SMD	22.45x21.44x0.3	0.98 Thk, 3 Layer

All Dimensions in mm

Motherboard

- 1.6mm Thick
- 0.38mm Pad NSMD

Package	Test Condition	Cycles Completed	# Tested	# Failed	1st Failure (cycles)	Mean Life (cycles)
FG860	TC3	5044	32	0	N/A	N/A

Test Data

- TC3 Only
- 5044 Cycles Completed
- No Failures