

The Reliability Data Program

January 1, 1997
Expanded Version

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Reliability Testing Summary

High Temperature Life Test

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC1700D, XC2000, XC3000/A, XC3100/A, XC4000
 Package Type: Various
 Actual Temperature: 145C
 Actual Voltage: 5.7V +/-0.25
 Assumed Activation Energy: 0.58 ev for EPROM, 0.90 ev for LCA

	XC1700D	XC2000	XC3000/A	XC3100/A	XC4000
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Period:	Jan 1, 1995 to Jan 1, 1997
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Combined Started Lot:	27	3	30	30	44
Combined Completed Lots:	27	3	30	30	44
Failures:	0	0	1	5	2
Device on test:	2,510	137	2,036	1,977	2,215
Actual device hours @ 145C:	2,507,401	107,682	1,896,964	1,816,322	2,092,730
Mean :	999	786	932	919	945
Equivalent device hours @ Tj=125C:	8,792,320	377,592	6,651,794	6,369,019	7,338,256
Equivalent device hours @ Tj=70C:	588,860,570	25,289,008	445,500,062	426,561,371	491,475,508
Equivalent device hours @ Tj=25C:	5.82E+10	2.50E+09	4.40E+10	4.22E+10	4.86E+10
Failure Rate in Fit @ Tj=70C:	0	0	2	12	4
Failure Rate in Fit @ Tj=25C:	0	0	0.02	0.12	0.04



Reliability Testing Summary

High Temperature Life Test

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC4000E, XC4000EX, XC5000, XC7000, XC9500
 Package Type: Various
 Actual Temperature: 145C (125C & 150C for XC7000 & XC9500)
 Actual Voltage: 5.7V +/-0.25
 Assumed Activation Energy: 0.58 ev for Eprom & Flash, 0.90 ev for LCA

	XC4000E	XC4000EX	XC5000	XC7000	XC9500
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Period:	Jan 1, 1995 to Jan 1, 1997
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Combined Started Lot:	34	1	19	16	6
Combined Completed Lots:	34	1	19	16	6
Failures:	7	0	1	0	0
Device on test:	2,591	44	1,731	1,526	436
Actual device hours @ 145C:	2,650,140	66,616	1,778,151	878,696	494,388
Mean :	1,023	1,514	1,027	576	1,134
Equivalent device hours @ Tj=125C:	9,292,841	233,592	6,235,170	878,696	1,733,596
Equivalent device hours @ Tj=70C:	622,382,679	15,644,700	417,596,950	58,850,144	116,106,583
Equivalent device hours @ Tj=25C:	6.15E+10	1.55E+09	4.13E+10	5.82E+09	1.15E+10
Failure Rate in Fit @ Tj=70C:	11	0	2	0	0
Failure Rate in Fit @ Tj=25C:	0.11	0	0.02	0	0



Reliability Testing Summary

High Temperature Life Test

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC1700D Microcircuit Group
 Package Type: PD8, PLCC-20, DD-8
 Actual Temperature: 145C
 Actual Voltage: 5.7V +/-0.25
 Assumed Activation Energy: 0.58 ev

XC1718D

XC1736D

XC1765D

XC1765L

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	3	6	11	1
Combined Completed Lots:	3	6	11	1
Failures:	0	0	0	0
Device on test:	362	621	869	76
Actual device hours:	381,193	586,925	665,100	89,756
Mean :	1,053	945	765	1,181
Equivalent device hours @ Tj=125C:	1,336,671	2,058,080	2,332,204	314,734
Equivalent device hours @ Tj=70C:	89,522,788	137,838,738	156,198,057	21,079,105
Equivalent device hours @ Tj=25C:	8.85E+09	1.36E+10	1.54E+10	2.08E+09
Failure Rate in FITS @ Tj=70C:	0	0	0	0
Failure Rate in FITS @ Tj=25C:	0	0	0	0

Failure Analysis:



Reliability Testing Summary

High Temperature Life Test

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC1700D Microcircuit Group
 Package Type: PD8, PLCC-20, DD-8
 Actual Temperature: 145C
 Actual Voltage: 5.7V +/-0.25
 Assumed Activation Energy: 0.58 ev

XC17128D

XC17256D

XC17256L

XC1700D

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	2	3	1	27
Combined Completed Lots:	2	3	1	27
Failures:	0	0	0	0
Device on test:	246	259	77	2,510
Actual device hours:	263,466	442,421	78,540	2,507,401
Mean :	1,071	1,708	1,020	999
Equivalent device hours @ Tj=125C:	923,856	1,551,370	275,404	8,792,320
Equivalent device hours @ Tj=70C:	61,874,722	103,902,121	18,445,039	588,860,570
Equivalent device hours @ Tj=25C:	6.12E+09	1.03E+10	1.82E+09	5.82E+10
Failure Rate in FITS @ Tj=70C:	0	0	0	0
Failure Rate in FITS @ Tj=25C:	0	0	0	0

Failure Analysis:



Reliability Testing Summary

High Temperature Life Test

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC2000 Microcircuit Group
 Package Type: PLCC- 84
 Actual Temperature: 145C
 Actual Voltage: 5.7V +/-0.25
 Assumed Activation Energy: 0.90 ev

XC2018

XC2000

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	3	3	
Combined Completed Lots:	3	3	
Failures:	0	0	
Device on test:	137	137	
Actual device hours:	107,682	107,682	
Mean :	786	786	
Equivalent device hours @ Tj=125C:	377,592	377,592	
Equivalent device hours @ Tj=70C:	25,289,008	25,289,008	
Equivalent device hours @ Tj=25C:	2.50E+09	2.50E+09	
Failure Rate in FITS @ Tj=70C:	0	0	
Failure Rate in FITS @ Tj=25C:	0	0	

Failure Analysis:



Reliability Testing Summary

High Temperature Life Test

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC3000/A Microcircuit Group
 Package Type: PLCC- 68 & 84, PGA-175
 Actual Temperature: 145C
 Actual Voltage: 5.7V +/-0.25
 Assumed Activation Energy: 0.90 ev

XC3020/A XC3030/A XC3042/A XC3064/A XC3090/A XC3000/A

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	5	4	10	2	9	30
Combined Completed Lots:	5	4	10	2	9	30
Failures:	0	0	0	0	1	1
Device on test:	344	264	746	94	588	2,036
Actual device hours:	339,365	297,075	589,055	127,605	543,864	1,896,964
Mean :	987	1,125	790	1,358	925	932
Equivalent device hours @ Tj=125C:	1,189,999	1,041,707	2,065,549	447,453	1,907,085	6,651,794
Equivalent device hours @ Tj=70C:	79,699,524	69,767,761	138,338,967	29,967,904	127,725,906	445,500,062
Equivalent device hours @ Tj=25C:	7.88E+09	6.90E+09	1.37E+10	2.96E+09	1.26E+10	4.40E+10
Failure Rate in FITS @ Tj=70C:	0	0	0	0	8	2
Failure Rate in FITS @ Tj=25C:	0	0	0	0	0.08	0.02

Failure Analysis:

F/A95017(1)-ORG

Reliability Testing Summary

High Temperature Life Test

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC3100/A Microcircuit Group
 Package Type: PLCC- 44 & 84, PGA-132 & 175, PQFP-100,160, &
 CB-100
 Actual Temperature: 145C
 Actual Voltage: 5.7V +/-0.25
 Assumed Activation Energy: 0.90 ev

XC3120/A XC3130/A XC3142/A XC3164/A XC3190/A XC3195/A XC3100/A

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	2	5	7	1	10	5	30
Combined Completed Lots:	2	5	7	1	10	5	30
Failures:	0	0	5	0	0	0	5
Device on test:	172	308	477	129	603	288	1,977
Actual device hours:	177,891	288,346	432,492	133,515	594,929	189,149	1,816,322
Mean :	1,034	936	907	1,035	987	657	919
Equivalent device hours @ Tj=125C:	623,783	1,011,099	1,516,554	468,177	2,086,147	663,260	6,369,019
Equivalent device hours @ Tj=70C:	41,777,520	67,717,764	101,570,305	31,355,862	139,718,469	44,421,450	426,561,371
Equivalent device hours @ Tj=25C:	4.13E+09	6.69E+09	1.00E+10	3.10E+09	1.38E+10	4.39E+09	4.22E+10
Failure Rate in FITS @ Tj=70C:	0	0	49	0	0	0	12
Failure Rate in FITS @ Tj=25C:	0	0	0.50	0	0	0	0.12

Failure Analysis:

F/A 96002(1)-VIM
 F/A 96043(4)-NDF



Reliability Testing Summary

High Temperature Life Test

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC4000 Microcircuit Group
 Package Type: PLCC-84, PGA-156
 Actual Temperature: 145C
 Actual Voltage: 5.7V +/-0.25
 Assumed Activation Energy: 0.90 ev

XC4002 XC4003 XC4004 XC4005

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	4	4	4	16
Combined Completed Lots:	4	4	4	16
Failures:	0	0	0	1
Device on test:	183	224	180	757
Actual device hours:	185,700	148,183	227,205	700,706
Mean :	1,015	662	1,262	927
Equivalent device hours @ Tj=125C:	651,166	519,611	796,705	245,059
Equivalent device hours @ Tj=70C:	43,611,456	34,800,627	53,358,863	164,560,090
Equivalent device hours @ Tj=25C:	4.31E+09	3.44E+09	5.27E+09	1.63E+10
Failure Rate in FITS @ Tj=70C:	0	0	0	6
Failure Rate in FITS @ Tj=25C:	0	0	0	0.06

Failure Analysis:

F/A-95077(1)-PFMP



Reliability Testing Summary

High Temperature Life Test

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC4000 Microcircuit Group
 Package Type: PLCC-84, PGA- 191, 223 & CB-196
 Actual Temperature: 145C
 Actual Voltage: 5.7V +/-0.25
 Assumed Activation Energy: 0.90 ev

XC4006

XC4010

XC4013

XC4000

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	12	3	44
Combined Completed Lots:	1	12	3	44
Failures:	0	1	0	2
Device on test:	47	596	228	2,215
Actual device hours:	95,786	523,870	211,280	2,092,730
Mean :	2,038	879	927	945
Equivalent device hours @ Tj=125C:	335,878	1,836,975	740,,863	7,338,256
Equivalent device hours @ Tj=70C:	22,495,244	123,030,336	49,618,893	491,475,508
Equivalent device hours @ Tj=25C:	2.22E+09	1.22E+10	4.90E+09	4.86E+10
Failure Rate in FITS @ Tj=70C:	0	8	0	4
Failure Rate in FITS @ Tj=25C:	0	0.08	0	0.04

Failure Analysis:

F/A96075(1)-FANC



Reliability Testing Summary

High Temperature Life Test

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC4000E Microcircuit Group
 Package Type: PLCC-84, PGA- 156, 191, PQFP-208
 Actual Temperature: 145C
 Actual Voltage: 5.7V +/-0.25
 Assumed Activation Energy: 0.90 ev

XC4003E

XC4005E

XC4006E

XC4008E

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	11	3	1
Combined Completed Lots:	1	11	3	1
Failures:	0	3	1	0
Device on test:	76	862	197	76
Actual device hours:	76,152	868,532	203,560	79,420
Mean :	1,002	1,008	1,033	1,045
Equivalent device hours @ Tj=125C:	267,031	3,045,548	713,793	278,490
Equivalent device hours @ Tj=70C:	17,884,220	203,973,855	47,805,859	18,651,706
Equivalent device hours @ Tj=25C:	1.77E+09	2.02E+10	4.73E+09	1.84E+09
Failure Rate in FITS @ Tj=70C:	0	15	21	0
Failure Rate in FITS @ Tj=25C:	0	0.15	0.21	0

Failure Analysis:

F/A95141(1)-VIM
 F/A96032(1)-PALM
 F/A96088(1)-FANC

F/A95092(1)-NDF



Reliability Testing Summary

High Temperature Life Test

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC4000E Microcircuit Group
 Package Type: PLCC-84, PGA- 191, 223 & 299
 Actual Temperature: 145C
 Actual Voltage: 5.7V +/-0.25
 Assumed Activation Energy: 0.90 ev

XC4010E XC4013E XC4020E XC4025E XC4000E



Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	6	8	1	3	34
Combined Completed Lots:	6	8	1	3	34
Failures:	2	0	0	1	7
Device on test:	416	660	76	228	2,591
Actual device hours:	423,906	686,514	76,000	236,056	2,650,140
Mean :	1,019	1,040	1,000	1,035	1,023
Equivalent device hours @ Tj=125C:	1,486,446	2,407,294	266,498	827,741	9,292,841
Equivalent device hours @ Tj=70C:	99,553,892	161,227,113	17,848,523	55,437,511	622,382,679
Equivalent device hours @ Tj=25C:	9.84E+09	1.59E+10	1.76E+09	5.48E+09	6.15E+10
Failure Rate in FITS @ Tj=70C:	20	0	0	18	11
Failure Rate in FITS @ Tj=25C:	0.20	0	0	0.18	0.11

Failure Analysis: F/A96009(1)-FANC
 F/A96064(1)-FANC

F/A96072(1)-NDF



Reliability Testing Summary High Temperature Operating Life Qualification & Monitor

Technology: Si Gate CMOS
Device Type: XC4000EX Microcircuit Group
Package Type: PG-411
Actual Temperature: 145C
Actual Voltage: 5.7V +/-0.25
Assumed Activation Energy: 0.90 ev

XC4036EX

XC4000EX

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	44	44
Actual device hours :	66,616	66,616
Mean :	1,514	1,514
Equivalent device hours @ Tj=125C:	233,592	233,592
Equivalent device hours @ Tj=70C:	15,644,700	15,644,700
Equivalent device hours @ Tj=25C:	1.55E+09	1.55E+09
Failure Rate in FITS @ Tj=70C:	0	0
Failure Rate in FITS @ Tj=25C:	0	0

Failure Analysis:



Reliability Testing Summary

High Temperature Life Test

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC5000 Microcircuit Group
 Package Type: PLCC-84
 Actual Temperature: 145C
 Actual Voltage: 5.7V +/-0.25
 Assumed Activation Energy: 0.90 ev

XC5202 XC5204 XC5206 XC5210 XC5215 XC5000

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	2	2	4	9	2	19
Combined Completed Lots:	2	2	4	9	2	19
Failures:	0	1	0	0	0	1
Device on test:	152	116	327	955	181	1,731
Actual device hours:	153,582	123,571	338,042	978,821	184,135	1,778,151
Mean :	1,010	1,065	1,034	1,025	1,017	1,027
Equivalent device hours @ Tj=125C:	538,543	433,308	1,185,360	3,432,282	645,678	6,235,170
Equivalent device hours @ Tj=70C:	36,068,576	29,020,523	79,388,819	229,875,114	43,243,917	417,596,950
Equivalent device hours @ Tj=25C:	3.57E+09	2.87E+09	7.85E+09	2.27E+10	4.27E+09	4.13E+10
Failure Rate in FITS @ Tj=70C:	0	34	0	0	0	2
Failure Rate in FITS @ Tj=25C:	0	0.35	0	0	0	0.02

Failure Analysis: F/A95090(1)-RAND



Reliability Testing Summary

High Temperature Operating Life

Qualification & Monitor

Technology: Si Gate CMOS
 Device Type: XC7000 Microcircuit Group
 Package Type: PLCC-84, WC44, 68 & 84, & PQFP-160
 Actual Temperature: 125C * & 150C**
 Actual Voltage: 5.0V +/-0.25* & 5.7V +/-0.25**
 Assumed Activation Energy: 0.90 ev

XC73108	XC73108	XC7336Q	XC7336	XC7372
*	**	*	**	*

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	1	1	4	1
Combined Completed Lots:	1	1	1	4	1
Failures:	0	0	0	0	0
Device on test:	45	107	105	401	107
Actual device hours :	45,270	6,527	108,465	62,179	18,404
Mean :	1,006	61	1,033	155	172
Equivalent device hours @ Tj=125C:	45,270	30,744	510,907	292,884	18,404
Equivalent device hours @ Tj=70C:	3,031,932	2,059,086	34,217,671	19,615,734	1,232,597
Equivalent device hours @ Tj=25C:	3.00E+08	2.04E+08	3.38E+09	1.94E+09	1.22E+08
Failure Rate in FITS @ Tj=70C:	0	0	0	0	0
Failure Rate in FITS @ Tj=25C:	0	0	0	0	0

Failure Analysis:



Reliability Testing Summary

High Temperature Operating Life

Qualification & Monitor

Technology: Si Gate CMOS
 Device Type: XC7000 Microcircuit Group
 Package Type: PLCC-84, WC44, 68 & 84, & PQFP-160
 Actual Temperature: 125C * & 150C**
 Actual Voltage: 5.0V +/-0.25* & 5.7V +/-0.25**
 Assumed Activation Energy: 0.90 ev

XC7236	XC7272A	XC73144	XC7354	XC7354	XC7000
**	*	*	*	**	@ 125 C

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	2	2	2	1	16
Combined Completed Lots:	1	2	2	2	1	16
Failures:	0	0	0	0	0	0
Device on test:	107	149	184	214	107	1,526
Actual device hours :	26,536	85,247	75,101	28,034	14,766	878,696
Mean :	248	572	408	131	138	576
Equivalent device hours @ Tj=125C:	124,993	85,247	75,101	28,034	69,553	878,696
Equivalent device hours @ Tj=70C:	8,371,365	5,709,369	5,029,846	1,877,561	4,658,260	58,850,144
Equivalent device hours @ Tj=25C:	8.28E+08	5.64E+08	4.97E+08	1.86E+08	4.6E+08	5.82E+09
Failure Rate in FITS @ Tj=70C:	0	0	0	0	0	0
Failure Rate in FITS @ Tj=25C:	0	0	0	0	0	0

Failure Analysis:



Reliability Testing Summary

High Temperature Operating Life Qualification & Monitor

Technology: Si Gate CMOS
 Device Type: XC9500 Microcircuit Group
 Package Type: PLCC-44 & 84 & HQFP-208
 Actual Temperature: 150C & 145C*
 Actual Voltage: 5.0V +/-0.25 & 5.7V +/-0.25
 Assumed Activation Energy: 0.58 ev

XC95108

XC95216

XC9536

XC9500

*

*

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	3	1	2	6
Combined Completed Lots:	3	1	2	6
Failures:	0	0	0	0
Device on test:	236	78	122	436
Actual device hours :	241,765	81,276	65,771	494,388
Mean :	1,024	1,042	539	1,134
Equivalent device hours @ Tj=125C:	1,138,794	382,837	309,803	1,733,596
Equivalent device hours @ Tj=70C:	76,270,088	25,640,302	20,748,909	116,106,583
Equivalent device hours @ Tj=25C:	7.54E+09	2.53E+09	2.05E+09	1.15E+10
Failure Rate in FITS @ Tj=70C:	0	0	0	0
Failure Rate in FITS @ Tj=25C:	0	0	0	0

Failure Analysis:



Reliability Testing Summary-Packages

Bias Moisture Life

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC1700D, XC2000, XC3000/A, XC3100/A, XC4000,
 Package Type: Various
 Test Condition: T=85C, R.H.=85%
 Bias Voltages: 5.0V +/- .25V

	XC1700D	XC2000	XC3000/A	XC3100/A	XC4000
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Period:	Jan 1, 1995 to Jan 1, 1997				
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Combined Started Lot:	10	3	13	3	29
Combined Completed Lots:	10	3	13	3	29
Failures:	0	0	0	0	1
Device on test:	540	135	616	135	1,959
Mean Test Hour s/Device:	945	1,052	1,050	1,050	971
Total Device Hours:	510,406	142,065	647,067	141,705	1,901,354



Reliability Testing Summary-Packages

Bias Moisture Life

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC4000E, XC5000, XC7000, XC9500
 Package Type: Various
 Test Condition: T=85C, R.H.=85%
 Bias Voltages: 5.0V +/- .25V

	XC4000E	XC5000	XC7000	XC9500
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	Period: Jan 1, 1995 to Jan 1, 1997			
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Combined Started Lot:	6	5	3	2
Combined Completed Lots:	6	5	3	2
Failures:	0	0	0	0
Device on test:	456	486	202	90
Mean Test Hour s/Device:	1,019	1,018	902	1,019
Total Device Hours:	464,582	494,761	182,248	91,710



Reliability Testing Summary-Packages

Bias Moisture Life

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC1700D Microcircuit Group
 Package Type: PD8, PLCC-20, VOIC-8 & SOIC-8
 Test Condition: T = 85C, R.H. = 85%
 Bias Voltages: 5.0V +/- .25V

	XC1718D	XC1736D	XC1765D	XC17256D	XC1700D
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Period:	Jan 1, 1995 to Jan 1, 1997				
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Combined Started Lot:	3	3	3	1	10
Combined Completed Lots:	3	3	3	1	10
Failures:	0	0	0	0	0
Device on test:	132	197	135	76	540
Mean Test Hour s/Device:	1,017	834	1,005	1,002	945
Total Device Hours:	134,217	164,317	135,720	76,152	510,406



Reliability Testing Summary-Packages

Bias Moisture Life

Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC2000 Microcircuit Group
Package Type: PLCC- 84
Test Condition: T = 85C, R.H. = 85%
Bias Voltages: 5.0V +/- .25V

XC2018

XC2000

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Period:	Jan 1, 1995 to Jan 1, 1997	
Combined Started Lot:	3	3
Combined Completed Lots:	3	3
Failures:	0	0
Device on test:	135	135
Mean Test Hour s/Device:	1,052	1,052
Total Device Hours:	142,065	142,065



Reliability Testing Summary-Packages

Bias Moisture Life

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC3000/A Microcircuit Group
 Package Type: PLCC-84, PQFP-100, & 160, HTFP-176,
 TQFP-100, VQFP-64, PPGA-132,175
 Test Condition: T = 85C, R.H. = 85%
 Bias Voltages: 5.0V +/- .25V

XC3020/A XC3030/A XC3042/A XC3064/A XC3090/A XC3000/A

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	2	1	4	4	2	13
Combined Completed Lots:	2	1	4	4	2	13
Failures:	0	0	0	0	0	0
Device on test:	90	45	180	180	121	616
Mean Test Hour s/Device:	1,047	1,002	1,132	1,013	1,006	1,050
Total Device Hours:	94,230	45,090	203,670	182,340	121,737	647,067
Failure Analysis Number:						



Reliability Testing Summary-Packages

Bias Moisture Life

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC3100/A Microcircuit Group
 Package Type: PLCC-84, PQFP-100, VQFP-100
 Test Condition: T = 85C, R.H. = 85%
 Bias Voltages: 5.0V +/- .25V

XC3142/A

XC3190/A

XC3100/A

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	2	1	3
Combined Completed Lots:	2	1	3
Failures:	0	0	0
Device on test:	90	45	135
Mean Test Hour s/Device:	1,161	828	1,050
Total Device Hours:	104,445	37,260	141,705
Failure Analysis Number:			



Reliability Testing Summary-Packages

Bias Moisture Life

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC4000 Microcircuit Group
 Package Type: PLCC-84, BGA-225, 432, HQFP-304
 PQFP- 208, & MQFP-208 & 240
 Test Condition: T = 85C, R.H. = 85%
 Bias Voltages: 5.0V +/- .25V

XC4003	XC4005	XC4010	XC4013	XC4025	XC4000
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Period:	Jan 1, 1995 to Jan 1, 1997
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Combined Started Lot:	1	8	12	4	4	29
Combined Completed Lots:	1	8	12	4	4	29
Failures:	0	0	0	0	1	1
Device on test:	45	610	824	277	203	1,959
Mean Test Hour s/Device:	1,000	1,017	954	917	967	971
Total Device Hours:	45,000	620,360	785,753	253,876	196,365	1,901,354
Failure Analysis Number:	F/A-95029(1)-VIM					



Reliability Testing Summary-Packages

Bias Moisture Life

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC4000E Microcircuit Group
 Package Type: PQFP-208, 240, PLCC-84
 Test Condition: T = 85C, R.H. = 85%
 Bias Voltages: 5.0V +/- .25V

XC4005E

XC4013E

XC4000E

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	3	3	6
Combined Completed Lots:	3	3	6
Failures:	0	0	0
Device on test:	230	226	456
Mean Test Hour s/Device:	1,033	1,005	1,019
Total Device Hours:	237,492	227,090	464,582
Failure Analysis Number:			



Reliability Testing Summary-Packages

Bias Moisture Life

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC5000 Microcircuit Group
 Package Type: PLCC-84, & VQFP-100
 Test Condition: T = 85C, R.H. = 85%
 Bias Voltages: 5.0V +/- .25V

XC5206

XC5210

XC5000

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	4	5
Combined Completed Lots:	1	4	5
Failures:	0	0	0
Device on test:	75	411	486
Mean Test Hour s/Device:	1,005	1,020	1,018
Total Device Hours:	75,375	419,386	494,761
Failure Analysis Number:			



Reliability Testing Summary-Packages

Bias Moisture Life

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC7000 Microcircuit Group
 Package Type: PLCC-44, BGA-225, PQFP-44
 Test Condition: T = 85C, R.H. = 85%
 Bias Voltages: 5.0V +/- .25V

XC7236A

XC73108

XC7336

XC7000

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	1	1	3
Combined Completed Lots:	1	1	1	3
Failures:	0	0	0	0
Device on test:	81	44	77	202
Mean Test Hour s/Device:	1,001	1,020	731	902
Total Device Hours:	81,081	44,880	56,287	182,248
Failure Analysis Number:				



Reliability Testing Summary-Packages

Bias Moisture Life

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC9500 Microcircuit Group
 Package Type: PLCC-84
 Test Condition: T = 85C, R.H. = 85%
 Bias Voltages: 5.0V +/- .25V

XC95106

XC9500

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	2	2
Combined Completed Lots:	2	2
Failures:	0	0
Device on test:	90	90
Mean Test Hour s/Device:	1,019	1,019
Total Device Hours:	91,710	91,710
Failure Analysis Number:		



Reliability Testing Summary-Packages

Pressure Pot

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC1700D, XC2000, XC3000/A, XC3100/A,
 & XC4000
 Package Type: Various
 Test Condition: T=121C; 2 atm. sat. steam

	XC1700D	XC2000	XC3000/A	XC3100/A	XC4000
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Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	8	3	14	3	20
Combined Completed Lots:	8	3	14	3	20
Failures:	0	0	0	0	0
Device on test:	391	135	661	166	1,304
Mean Test Hour s/Device:	115	96	96	96	104
Total Device Hours:	44,832	12,960	63,456	15,936	135,552



Reliability Testing Summary-Packages

Pressure Pot

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC4000E, XC4000EX, XC5000, XC7000, & XC9500
 Package Type: Various
 Test Condition: T=121C; 2 atm. sat. steam

	XC4000E	XC4000EX	XC5000	XC7000	XC9500
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Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	1	1	6	2
Combined Completed Lots:	1	1	1	6	2
Failures:	0	0	0	0	0
Device on test:	77	13	78	344	173
Mean Test Hour s/Device:	96	96	96	173	96
Total Device Hours:	7,392	1,248	7,488	59,6116	16,608



Reliability Testing Summary-Packages

Pressure Pot

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC1700D Microcircuit Group
 Package Type: PD8, VOIC-8, & SOIC-8
 Test Condition: T = 121C; 2 atm. sat. steam

XC1718D

XC1736D

XC1765D

XC1700D

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	2	3	3	8
Combined Completed Lots:	2	3	3	8
Failures:	0	0	0	0
Device on test:	90	166	135	391
Mean Test Hour s/Device:	96	140	96	115
Total Device Hours:	8,640	23,232	12,960	44,832
Failure Analysis Number:				



Reliability Testing Summary-Packages

Pressure Pot

Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC2000 Microcircuit Group
Package Type: PLCC- 84
Test Condition: T = 121C; 2 atm. sat. steam.

XC2018

XC2000

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	3	3
Combined Completed Lots:	3	3
Failures:	0	0
Device on test:	135	135
Mean Test Hour s/Device:	96	96
Total Device Hours:	12,960	12,960
Failure Analysis Number:		



Reliability Testing Summary-Packages

Pressure Pot

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC3000/A Microcircuit Group
 Package Type: PLCC-84, VQFP-64, 100, PQFP-100, 160, TQFP-100, 144
 & PPGA-132,175
 Test Condition: T = 121C; 2 atm. sat. steam.

XC3020/A XC3030/A XC3042/A XC3064/A XC3090/A XC3000/A

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	2	1	5	5	1	14
Combined Completed Lots:	2	1	5	5	1	14
Failures:	0	0	0	0	0	0
Device on test:	90	45	256	225	45	661
Mean Test Hour s/Device:	96	96	96	96	96	96
Total Device Hours:	8,640	4,320	24,576	21,600	4,320	63,456
Failure Analysis Number:						



Reliability Testing Summary-Packages

Pressure Pot

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC3100/A Microcircuit Group
 Package Type: PQFP-160 & 208, VQFP-100
 Test Condition: T = 121C; 2 atm. sat. steam.

XC3142/A

XC3190/A

XC3195/A

XC3100/A

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	1	1	3
Combined Completed Lots:	1	1	1	3
Failures:	0	0	0	0
Device on test:	45	76	45	166
Mean Test Hour s/Device:	96	96	96	96
Total Device Hours:	4,320	7,296	4,320	15,936
Failure Analysis Number:				



Reliability Testing Summary-Packages

Pressure Pot

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC4000 Microcircuit Group
 Package Type: PQFP-160, 208, & MQFP-240, CG-225
 PLCC-84, BGA-225, HQ-304, HT-208
 Test Condition: T = 121C; 2 atm. sat. steam

	XC4003	XC4005	XC4010	XC4013	XC4025	XC4000
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Period:	Jan 1, 1995 to Jan 1, 1997				
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Combined Started Lot:	1	4	9	4	2	20
Combined Completed Lots:	1	4	9	4	2	20
Failures:	0	0	0	0	0	0
Device on test:	45	273	611	277	98	1,304
Mean Test Hour s/Device:	96	96	113	96	96	104
Total Device Hours:	4,320	26,208	69,024	26,592	9,408	135,552
Failure Analysis Number:						



Reliability Testing Summary-Packages

Pressure Pot

Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4000E Microcircuit Group
Package Type: HQ-304
Test Condition: T = 121C; 2 atm. sat. steam

XC4025E

XC4000E

Period:	Jan 1, 1995 to Jan 1, 1997	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	77	77
Mean Test Hour s/Device:	96	96
Total Device Hours:	7,392	7,392
Failure Analysis Number:		



Reliability Testing Summary-Packages

Pressure Pot

Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC4000EX Microcircuit Group
Package Type: HQ-304
Test Condition: T = 121C; 2 atm. sat. steam

XC4036EX

XC4000EX

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	13	13
Mean Test Hour s/Device:	96	96
Total Device Hours:	1,248	1,248
Failure Analysis Number:		



Reliability Testing Summary-Packages

Pressure Pot

Qualification & Monitor Combined

Technology: Si Gate CMOS
Device Type: XC5000 Microcircuit Group
Package Type: VQFP-100
Test Condition: T = 121C; 2 atm. sat. steam

XC5206

XC5000

Period:	Jan 1, 1995 to Jan 1, 1997	
Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	78	78
Mean Test Hour s/Device:	96	96
Total Device Hours:	7,488	7,488
Failure Analysis Number:		



Reliability Testing Summary-Packages

Pressure Pot

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC7000 Microcircuit Group
 Package Type: BGA-225, PLCC-44
 Test Condition: T = 121C; 2 atm. sat. steam

XC73108

XC7336

XC7354

XC7000

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	2	3	1	6
Combined Completed Lots:	2	3	1	6
Failures:	0	0	0	0
Device on test:	90	232	22	344
Mean Test Hour s/Device:	144	192	96	173
Total Device Hours:	12,960	44,544	2,112	59,6116
Failure Analysis Number:				



Reliability Testing Summary-Packages

Pressure Pot

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC9500 Microcircuit Group
 Package Type: PQFP-160, & HQ-208
 Test Condition: T = 121C; 2 atm. sat. steam

XC95108

XC95216

XC9500

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	1	2
Combined Completed Lots:	1	1	2
Failures:	0	0	0
Device on test:	129	44	173
Mean Test Hour s/Device:	96	96	96
Total Device Hours:	12,384	4,224	16,608
Failure Analysis Number:			



Reliability Testing Summary-Packages

Temperature Cycle(Air to Air)

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC1700D, XC2000, XC3000/A, XC3100/A & XC4000
 Package Type: Various
 Test Condition: T = -65C / +150C (Air to Air)

	XC1700D	XC2000	XC3000/A	XC3100/A	XC4000
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Period:	Jan 1, 1995 to Jan 1, 1997				
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Combined Started Lot:	11	3	14	5	29
Combined Completed Lots:	11	3	14	5	29
Failures:	0	0	0	0	0
Device on test:	588	135	661	292	1,942
Mean Test Cycles/Device:	515	555	534	612	674
Total Device Cycles:	302,581	74,925	352,746	178,595	1,309,167
Failure Analysis Number:					



Reliability Testing Summary-Packages

Temperature Cycle(Air to Air)

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC4000E, XC5000, XC7000 & XC9500
 Package Type: Various
 Test Condition: T = -65C / +150C (Air to Air)

	XC4000E	XC5000	XC7000	XC9500
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Period:	Jan 1, 1995 to Jan 1, 1997			
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Combined Started Lot:	12	6	6	1
Combined Completed Lots:	12	6	6	1
Failures:	0	0	0	0
Device on test:	1,023	650	455	77
Mean Test Cycles/Device:	643	626	579	537
Total Device Cycles:	657,392	406,661	263,509	41,349
Failure Analysis Number:				



Reliability Testing Summary-Packages

Temperature Cycle(Air to Air)

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC1700D Microcircuit Group
 Package Type: PD-8, VOIC-8, & SOIC-8
 Test Condition: T = -65C/+150C (Air to Air)

	XC1718D	XC1736D	XC1765D/L	XC17256D	XC1700D
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Period:	Jan 1, 1995 to Jan 1, 1997				
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Combined Started Lot:	3	3	4	1	11
Combined Completed Lots:	3	3	4	1	11
Failures:	0	0	0	0	0
Device on test:	135	166	211	76	588
Mean Test Cycles/Device:	453	536	527	543	515
Total Device Cycles:	61,110	88,992	111,211	41,268	302,581
Failure Analysis Number:					



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

Technology: Si Gate CMOS
Device Type: XC2000 Microcircuit Group
Package Type: PLCC- 84
Test Condition: T = -65C/+150C (Air to Air)

XC2018

XC2000

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	3	3
Combined Completed Lots:	3	3
Failures:	0	0
Device on test:	135	135
Mean Test Cycles/Device:	555	555
Total Device Cycles:	74,925	74,925
Failure Analysis Number:		



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

Technology: Si Gate CMOS
Device Type: XC3000/A Microcircuit Group
Package Type: PLCC- 84, VQFP-100, 64, PQFP-100, 160,
TQFP-100, 144, & PGA-132, HTFP-176
Test Condition: T = -65C/+150C (Air to Air)

XC3020/A XC3030/A XC3042/A XC3064/A XC3090/A XC3000/A

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	2	1	5	5	1	14
Combined Completed Lots:	2	1	5	5	1	14
Failures:	0	0	0	0	0	0
Device on test:	90	45	256	225	45	661
Mean Test Cycles/Device:	538	504	542	518	586	534
Total Device Cycles:	48,420	22,680	138,681	116,595	26,370	352,746
Failure Analysis Number:						



Reliability Testing Summary-Packages

Temperature Cycle(Air to Air)

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC3100/A Microcircuit Group
 Package Type: PQFP-100, 160, 208, VQFP-100, & PLCC-84
 Test Condition: T = -65C/+150C (Air to Air)

XC3142/A

XC3190/A

XC3195/A

XC3100/A

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	2	2	1	5
Combined Completed Lots:	2	2	1	5
Failures:	0	0	0	0
Device on test:	90	157	45	292
Mean Test Cycles/Device:	286	820	538	612
Total Device Cycles:	25,695	128690	24,210	178,595
Failure Analysis Number:				



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

Technology: Si Gate CMOS
 Device Type: XC4000 Microcircuit Group
 Package Type: MQFP- 240, PQFP-160, 208, HT-208
 PGA-191, PLCC-84
 Test Condition: T = -65C/+150C (Air to Air)
 *For BGA-225, T=-55/+125C

XC4003

XC4005

XC4010

XC4013

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	7	13	2
Combined Completed Lots:	1	7	13	2
Failures:	0	0	0	0
Device on test:	45	499	857	154
Mean Test Hour s/Device:	571	569	659	567
Total Device Hours:	25,695	283,973	564,906	87,272



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

Technology: Si Gate CMOS
Device Type: XC4000 Microcircuit Group
Package Type: MQFP-240, HQ-304, & BGA-225 & 432
Test Condition: T = -65C/+150C (Air to Air)
*For BGA-225, T=-55/+125C

XC4013*

XC4025

XC4025*

XC4000

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	3	2	1	29
Combined Completed Lots:	3	2	1	29
Failures:	0	0	0	0
Device on test:	196	115	76	1,942
Mean Test Hour s/Device:	906	814	1,000	674
Total Device Hours:	177,661	93,660	76,000	1,309,167



Reliability Testing Summary-Packages

Temperature Cycle(Air to Air)

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC4000E Microcircuit Group
 Package Type: PQFP-160, 208, 240, PGA-156, 223 & 299, PLCC-84
 Test Condition: T = -65C/+150C (Air to Air)

	XC4005E	XC4010E	XC4013E	XC4025E	XC4000E
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Period:	Jan 1, 1995 to Jan 1, 1997				
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Combined Started Lot:	2	2	7	1	12
Combined Completed Lots:	2	2	7	1	12
Failures:	0	0	0	0	0
Device on test:	208	206	536	73	1,023
Mean Test Cycles/Device:	519	747	665	537	643
Total Device Cycles:	108,005	153,830	356,356	39,201	657,392
Failure Analysis Number:					



Reliability Testing Summary-Packages

Temperature Cycle(Air to Air)

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC5000 Microcircuit Group
 Package Type: PLCC-84, PQFP-208, VQFP-100
 Test Condition: T = -65C/+150C (Air to Air)

XC5206

XC5210

XC5215

XC5000

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	4	1	6
Combined Completed Lots:	1	4	1	6
Failures:	0	0	0	0
Device on test:	78	465	107	650
Mean Test Cycles/Device:	558	666	501	626
Total Device Cycles:	43,524	309,530	53,607	406,661
Failure Analysis Number:				



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

Technology: Si Gate CMOS
Device Type: XC7000 Microcircuit Group
Package Type: WC-44, BGA-225, PQFP-44 & PLCC-44
Test Condition: T = -65C/+150C (Air to Air)
* For BGA-225, T = -55C/+125C

XC7236	XC7336	XC73108*	XC7354	XC7000
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Period:	Jan 1, 1995 to Jan 1, 1997
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Combined Started Lot:	1	3	2	1	6
Combined Completed Lots:	1	3	2	1	6
Failures:	0	0	0	0	0
Device on test:	81	230	121	23	455
Mean Test Cycles/Device:	571	460	819	539	579
Total Device Cycles:	46,251	105,714	99,147	12,397	263,509
Failure Analysis Number:					



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

Technology: Si Gate CMOS
Device Type: XC9500 Microcircuit Group
Package Type: PLCC-84
Test Condition: T = -65C/+150C (Air to Air)

XC95108

XC9500

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	77	77
Mean Test Cycles/Device:	537	537
Total Device Cycles:	41,349	41,349
Failure Analysis Number:		



Reliability Testing Summary-Packages

Thermal Shock (Liquid to Liquid)

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC3000/A, XC3100/A, XC4000, XC7000
 Package Type: Various
 Test Condition: T = -65C/+150C (Liquid to Liquid)

XC3000/A

XC3100 /A

XC4000

XC7000

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	1	3	1
Combined Completed Lots:	1	1	3	1
Failures:	0	0	0	0
Device on test:	45	45	133	45
Mean Test Cycles/Device:	500	500	500	1,008
Total Device Cycles:	22,500	22,500	66,500	45,360
Failure Analysis Number:				



Reliability Testing Summary-Packages

Thermal Shock (Liquid to Liquid)

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC3000/A Microcircuit Group
 Package Type: TQFP-144
 Test Condition: T = -65C/+145C (Liquid to Liquid)

XC3064/A

XC3000/A

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	45	45
Mean Test cycles/Device:	500	500
Total Device Cycles:	22,500	22,500
Failure Analysis Number:		



Reliability Testing Summary-Packages

Thermal Shock (Liquid to Liquid)

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC3100/A Microcircuit Group
 Package Type: PQFP-208
 Test Condition: T = -65C/+145C (Liquid to Liquid)

XC3195/A

XC3100 /A

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	45	45
Mean Test Cycles/Device:	500	500
Total Device Cycles:	22,500	22,500
Failure Analysis Number:		



Reliability Testing Summary-Packages

Thermal Shock (Liquid to Liquid)

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC4000 Microcircuit Group
 Package Type: MQFP-240, HT-208 & CG-225
 T = -65C/+145C (Liquid to Liquid)
 Test Condition:

	XC4005	XC4010	XC4013	XC4000
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Period:	Jan 1, 1995 to Jan 1, 1997			
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Combined Started Lot:	1	1	1	3
Combined Completed Lots:	1	1	1	3
Failures:	0	0	0	0
Device on test:	43	76	14	133
Mean Test Cycles/Device:	500	500	500	500
Total Device Cycles:	21,500	38,000	7,000	66,500



Reliability Testing Summary-Packages

Thermal Shock (Liquid to Liquid)

Qualification & Monitor Combined

Technology: Si Gate CMOS
 Device Type: XC7000 Microcircuit Group
 Package Type: BGA-225
 Test Condition: T = -55C/+125C (Liquid to Liquid)

XC73108

XC7000

Period:

Jan 1, 1995 to Jan 1, 1997
 Oct. 1, 1992 to Sept. 30, 1994

Combined Started Lot:	1	1
Combined Completed Lots:	1	1
Failures:	0	0
Device on test:	45	45
Mean Test Cycles/Device:	1,008	1,008
Total Device Cycles:	45,360	45,360



Reliability Testing Summary

Package Qualification / Monitor

PD-8

Device Type: XC1718, XC1736D, XC1765D, XC17256L
 Package Type: PD8
 Die Attach Method: 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	6	0	332	504	167,509
Pressure Pot	3	0	135	96	12,960
Salt Atmosphere	2	0	30	24	720
Solderability	3	0	9		
Resistance to Solvents	5	0	15		
Lead Fatigue	3	0	18		
Physical Dimension	4	0	20		

Period: Jan. 1st, 1995 to Jan 1st, 1997



**Reliability Testing Summary
Package Qualification / Monitor
SOIC**

Device Type: XC1718D, XC1736D, XC1765D
Package Type: SOIC-8
Die Attach Method: Silver Epoxy
Molding Compound: Sumitomo 6300H

Reliability Test	Combined No.Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	4	0	180	530	95,400
Pressure Pot	4	0	180	96	17,280
Solderability	4	0	12		
Lead Fatigue	4	0	21		
Physical Dimension	4	0	20		
Reistance to Solvents	4	0	12		

Period: Jan. 1st, 1995 to Jan. 1st, 1997



Reliability Testing Summary

Package Qualification / Monitor

PLCC

Device Type: XC2018, XC3020/A, XC3190, XC4005, XC4010,
 XC4005E, XC4010E XC5210, XC7336, XC7354
Package Type: PLCC-44, & 84
Die Attach Method: Silver Epoxy
Molding Compound: Sumitomo 6300H

Reliability Test	Combined No. Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	23	0	1,738	598	1,039,772
Pressure Pot	13	0	772	138	106,752
Salt Atmosphere	1	0	15	24	360
Solderability	5	0	19		
Resistance to Solvents	6	0	18		
Lead Fatigue	5	0	15		
Physical Dimension	5	0	25		

Period: Jan. 1st, 1995 to Jan. 1st, 1997



Reliability Testing Summary

Package Qualification / Monitor

PQFP

Device Type: XC3020, XC3042/A, XC3064/A, XC95108,
XC3142/A, XC3190/A, XC3195/A, XC4003, XC4005,
XC4010, XC4013, XC4013E, XC5215, XC7336

Package Type: PQFP-44, 100, 160, 208 & 240

Die Attach Method: Silver Epoxy

Molding Compound: Sumitomo 6300H & EME-7304LC

Reliability Test	Combined No. Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/S	1	0	45	500	22,500
T/C	26	0	1,878	639	1,200,108
Pressure Pot	14	0	964	96	92,544
Salt Atmosphere	2	0	30	24	720
Solderability	9	0	27		
Resistance to Solvents	11	0	33		
Lead Fatigue	13	0	39		
Physical Dimension	14	0	70		

Period: Jan. 1st, 199 to Jan. 1st, 1997



Reliability Testing Summary Package Qualification / Monitor TQFP

Device Type: XC3042/A, XC3064/A
Package Type: TQFP-100 & 144
Die Attach Method: Silver Epoxy
Molding Compound: EME-7320

Reliability Test	Combined No. Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/S	1	0	45	500	22,500
T/C	3	0	135	515	69,570
Pressure Pot	3	0	135	96	12,960
Solderability	3	0	9		
Resistance to Solvents	3	0	9		
Lead Fatigue	3	0	9		
Physical Dimension	3	0	10		

Period: Jan. 1st, 1995 to Jan. 1st, 1997



Reliability Testing Summary

Package Qualification / Monitor

VQFP

Device Type: XC3030/A, XC3042L, XC3142/A, XC5206
Package Type: VQFP-64, & 100
Die Attach Method: Silver Epoxy
Molding Compound: EME-7320

Reliability Test	Combined No.Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	4	0	213	553	117,864
Pressure Pot	4	0	213	96	20,448
Resistance to Solvents	4	0	12		
Lead Fatigue	4	0	12		
Physical Dimension	4	0	20		
Solderability	4	0	12		

Period: Jan. 1st, 1995 to Jan. 1st, 1997



Reliability Testing Summary

Package Qualification / Monitor

HQFP

Device Type: XC4025, XC40525E, XC4036EX, XC95216
Package Type: HQFP-208 & 304
Die Attach Method: 84-1LMSR4
Molding Compound: Sumitomo 7304L

Reliability Test	Combined No.Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	1	0	70	1,005	70,350
Pressure Pot	4	0	206	96	19,776
Resistance to Solvents	1	0	3		
Lead Fatigue	1	0	3		
Physical Dimension	1	0	5		
Solderability	1	0	5		
Adhesion to lead finish	1	0	3		

Period: Jan. 1st, 1995 to Jan. 1st, 1997



Reliability Testing Summary

Package Qualification / Monitor

PPGA

Device Type: XC3042/A, XC3064/A & XC3090/A
 Package Type: PPGA-132, & 175
 Die Attach Method: Silver Epoxy
 Sealant Material: R4785

Reliability Test	Combined No.Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/C	5	0	261	764	199,422
Pressure Pot	5	0	225	96	21,600
Solderability	5	0	15		
Resistance to Solvents	5	0	15		
Lead Fatigue	5	0	15		
Physical Dimension	5	0	25		

Period: Jan. 1st, 1995 to Jan 1st, 1997



Reliability Testing Summary Package Qualification / Monitor MQFP

Device Type: XC4005 & XC4025
Package Type: MQFP-240
Die Attach Method: Silver Epoxy

Reliability Test	Combined No.Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/S	1	0	43	500	21,500
T/C	2	0	89	528	47,026
Pressure Pot	2	0	71	96	6,816
Salt Atmosphere	1	0	15	24	960
Solderability	2	0	6		
Resistance to Solvents	2	0	6		
Lead Fatigue	2	0	6		
Physical Dimension	2	0	10		

Period: Jan. 1st, 1995 to Jan. 1st, 1997



Reliability Testing Summary

Package Qualification / Monitor

BGA

Device Type: XC73108, XC4010, XC4013 & XC4025
 Package Type: BGA-225 & BGA-432
 Die Attach Method: Silver Epoxy
 Test Condition: -55C/+125C for T/S & T/C

Reliability Test	Combined No.Lots	Failures	Device On Test	Mean Test Hrs/Cycles	Total Device Hrs
T/S	1	0	45	1,008	45,360
T/C	6	0	393	898	352,808
Pressure Pot	4	0	244	114	27,744
Resistance to Solvents	2	0	6		
Physical Dimension	5	0	25		
Ball Shear	1	0	5		

Period: Jan. 1st, 1995 to Jan. 1st, 1998



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	312	0		
B3	Solderability	222	0		
B5	Bond Strenght	302	0		
D1	Physical Dimension	115	0		
D2	Lead Integrity	24	0		
	Seal				
D3	Thermal Shock	193	1	15	2,895
	Temperature Cycle			100	19,300
	Seal				
	Visual Examination				
	End-Point Elect.				
	Parametrics				
D4	Mechanical Shock	193	2		
	Vibration, Var. Freq.				
	Constant Accel.				
	Seal				
	Visual Examination				
	End-Point Elec. Para.				
D5	Salt Atmosphere	165	1		
	Seal				
	Visual Examination				
D6	Internal Water-Vapor Content	30	0		
D7	Adhesion of lead finish	24	0		

Period: Jan. 1st, 1995 to Jan. 1st, 1997



Reliability Testing Summary

CB Package Qualification / Monitor

CB-100, -164, -196, -228

Code	Test	Combined Sample	Failures	Mean Hrs/Cycles Per Device	Total Device Hours
B2	Resistance to Solvents	165	0		
B3	Solderability	117	0		
B5	Bond Strenght	160	0		
D1	Physical Dimension	105	0		
D2	Lead Integrity	21	0		
	Seal				
D3	Thermal Shock	125	0	15	1,875
	Temperature Cycle			100	12,500
	Seal				
	Visual Examination				
	End-Point Elect.				
	Parametrics				
D4	Mechanical Shock	148	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	23	0		
D7	Adhesion of lead finish	21	0		

Period: Jan. 1st, 1995 to Jan. 1st, 1997



Reliability Testing Summary

CQFP Package Qualification / Monitor

CQFP-100, & -164

Code	Test	Combined Sample	Failures	Mean Hrs/Cycles Per Device	Total Device Hours
B2	Resistance to Solvents	27	0		
B3	Solderability	21	0		
B5	Bond Strenght	28	0		
D1	Physical Dimension	75	0		
D2	Lead Integrity	15	0		
	Seal		0		
D3	Thermal Shock	118	0	15	1,770
	Temperature Cycle			100	11,800
	Seal				
	Visual Examination				
	End-Point Elect.				
	Parametrics				
D4	Mechanical Shock	85	2		
	Vibration, Var. Freq.				
	Constant Accel.				
	Seal				
	Visual Examination				
	End-Point Elec. Para.				
D5	Salt Atmosphere	75	0		
	Seal				
	Visual Examination				
D6	Internal Water-Vapor Content	20	0		
D7	Adhesion of lead finish	15	0		
D8	Lead Torque	25	0		

Period: Jan. 1st, 1995 to Jan. 1st, 1997



Reliability Testing Summary DD8 Package Qualification / Monitor

Code	Test	Combined Sample	Failures	Mean Hrs/Cycles Per Device	Total Device Hours
B2	Resistance to Solvents	69	0		
B3	Solderability	33	0		
B5	Bond Strenght	44	0		
D1	Physical Dimension	90	0		
D2	Lead Integrity	36	0		
	Seal				
D3	Thermal Shock	100	0	15	1,500
	Temperature Cycle			100	10,000
	Seal				
	Visual Examination				
	End-Point Elect.				
	Parametrics				
D4	Mechanical Shock	100	0		
	Vibration, Var. Freq.				
	Constant Accel.				
	Seal				
	Visual Examination				
	End-Point Elec. Para.				
D5	Salt Atmosphere	90	0		
	Seal				
	Visual Examination				
D6	Internal Water-Vapor Content	24	0		
D7	Adhesion of lead finish	18	0		
D8	Lead Torque	30	0		

Period: Jan. 1st, 1995 to Jan. 1st, 1997



Reliability Testing Summary WC44 Package Qualification (EPLD)

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

Period: Jan. 1st, 1995 to Jan. 1st, 1997



Reliability Testing Summary WC68 Package Qualification (EPLD)

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

Period: Jan. 1st, 1995 to Jan 1st, 1997



Reliability Testing Summary WC84 Package Qualification (EPLD)

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

Period: Jan. 1st, 1995 to Jan 1st, 1997



Reliability Testing Summary PG84 Package Qualification (EPLD)

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

Period: Jan. 1st, 1995 to Jan 1st, 1997



Reliability Testing Summary PG144 Package Qualification (EPLD)

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

Period: Jan. 1st, 1995 to Jan 1st, 1997



Reliability Testing Summary-Packages

EIAJ Temperature Soldering Heat Test

Technology: Si-Gate CMOS
Device Type: XC1700 Microcircuit Group
Package Type: PD8C & PLCC20
Foundry/Assembly: Nippon Denso & TSMC / Anam & AAPI
Preconditionning Test Condition: T = 85C, R.H. = 85%
Test Duration: 240 hours
Solder Heat Temp.: 350 +/- 10 degrees C
Test Duration: 3 + 0.5/-0 seconds

XC1736A

XC17128D

XC1765

XC1700

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	1	3	5
Combined Completed Lots:	1	1	3	5
Failures:	0	0	0	0
Device on test:	5	3	13	21
Failure Analysis:				

Note : Solderability test applied to all leads



Reliability Testing Summary-Packages EIAJ Temperature Soldering Heat Test

Technology: Si-Gate CMOS
 Device Type: XC3000/A & XC3100/A Microcircuit Group
 Package Type: PLCC-68, 84 & PPGA-132
 Foundry/Assembly: Seiko/Anam
 Preconditionning Test Condition: T = 85C, R.H. = 85%
 Test Duration: 240 hours
 Solder Heat Temp.: 350 +/- 10 degrees C
 Test Duration: 3 + 0.5/-0 seconds

XC3020/A XC3030/ XC3042/A XC3142/A XC3000/A/XC3100/A

Period: Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	2	1	2	1	6
Combined Completed Lots:	2	1	2	1	6
Failures:	0	0	0	0	0
Device on test:	10	5	10	3	28
Failure Analysis:					

Note : Solderability test applied to all leads



Reliability Testing Summary-Packages

EIAJ Temperature Soldering Test

Technology: Si-Gate CMOS
 Device Type: XC1700 Microcircuit Group
 Package Type: PD8C & PLCC-20
 Foundry/Assembly: Nippon Denso & TSMC / Anam & AAPI
 Preconditionning Test Condition: Steam Age
 Test Duration: 1 hour min.
 Solder Heat Temp.: 230 +/- 5 degrees C
 Test Duration: 3 +/- 1 seconds
 Rate: 1 +/- 0.1 in./sec.

XC 1736A

XC1765D

XC17128D

XC1700

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	1	1	1	3
Combined Completed Lots:	1	1	1	3
Failures:	0	0	0	0
Device on test:	3	3	3	9
Failure Analysis:				

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



Reliability Testing Summary-Packages

EIAJ Temperature Soldering Test

Technology: Si-Gate CMOS
Device Type: XC3000/A Microcircuit Group
Package Type: PLCC-68, 84 & PPGA-132 & PQFP-120
Foundry/Assembly: Seiko/Anam
Preconditionning Test Condition: Steam Age
Test Duration: 1 hour min.
Solder Heat Temp.: 230 +/- 5 degrees C
Test Duration: 3 +/-1 seconds
Rate: 1 +/- 0.1 in.sec

XC3020/A

XC3090/A

XC3142/A

XC3000/A/XC3100/A

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:	2	1	1	4
Combined Completed Lots:	2	1	1	4
Failures:	0	0	0	0
Device on test:	6	3	3	12
Failure Analysis:				

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



Reliability Testing Summary-Packages

EIAJ Temperature Soldering Test

Technology: Si-Gate CMOS
Device Type: XC4000 Microcircuit Group
Package Type: PQFP-208 & MQFP-208
Foundry/Assembly: Seiko / Anam & Indy
Preconditionning Test Condition: Steam Age
Test Duration: 1 hour min.
Solder Heat Temp.: 230 +/- 5 degrees C
Test Duration: 3 +/- 1 second
Rate: 1 +/- 0.1 in./sec.

XC4008

XC4010

XC4000

Period:

Jan 1, 1995 to Jan 1, 1997

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 the number of leads LTPD 10, 22 leads accept on 0



Reliability Testing Summary-Packages Low Temperature Soldering Heat Test

Technology: Si-Gate CMOS
 Device Type: Various Microcircuits
 Package Type: PQFP-100, 120, 160 ,208, MQFP-208, & PPGA-175
 Steam Age: 2 hours
 Flux: RMA
 Solder Heat Temp.: 215 +/- 5 degrees C

	PQ100	PQ120	PQ160	PQ208	MQ208	PP175
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Period:	Jan 1, 1995 to Jan 1, 1997					
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Combined Started Lot:	2	1	2	1	3	1
Combined Completed Lots:	2	1	2	1	3	1
Failures:	0	0	0	0	0	0
Device on test:	10	3	9	3	5	3
Failure Analysis:						

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



Reliability Testing Summary-Packages Low Temperature Soldering Heat Test

Technology: Si-Gate CMOS
Device Type: Various Microcircuits
Package Type: PD-8, & PLCC-20, 84
Steam Age: 2 hours
Flux: RMA
Solder Heat Temp.: 215 +/- 5 degrees C

PD8

PC20

PC84

Period:

Jan 1, 1995 to Jan 1, 1997

Combined Started Lot:

1

1

1

Combined Completed Lots:

1

1

1

Failures:

0

0

0

Device on test:

3

3

3

Failure Analysis:

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

