



MOTOROLA

SEMICONDUCTOR PRODUCTS SECTOR

**Imaging and Entertainment Solutions
With
Networking Computing Systems Group**

**Reliability & Quality Audit Report
(By Monitor Center)**

Fourth Quarter 1998

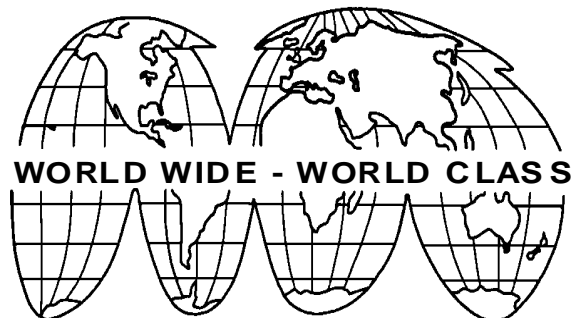


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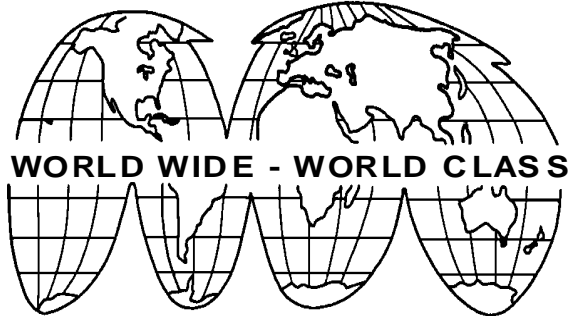
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- Failure Analysis



Section 1

Test

Methodology

- Motorola's Reliability Audit Program
Reliability Data Analysis Methods and
Reliability Stress Test Descriptions
Reference:
<http://www.mot.com/SPS/HPESD/quality/csg/3Q98/index.html>
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MOTOROLA'S RELIABILITY AUDIT PROGRAM

The Motorola Reliability and Quality Audit Program is designed to generate an ongoing database of reliability and quality performance for various categories of products. This program allows Motorola to develop a large database of reliability results that can be reported to customers and will identify any negative trends requiring corrective action.

The reliability monitor tests are conducted on sample groups pulled on a quarterly basis from products representing a matrix of processing and packaging technologies. Product mix, sample availability, and equipment capacity may cause the specific products chosen for testing to vary from quarter to quarter. Each sample group is subjected to a specific set of reliability tests appropriate for that product type. At the end of each quarter, results are reported for all sample groups that have completed testing within the past one year.

These testing and reporting systems combine to form a comprehensive reliability monitor program for each fabrication and assembly process used to produce Motorola integrated circuits. _

For Reliability Data Analysis Methods and Reliability Stress Test Descriptions Refer to <http://www.mot.com/SPS/HPESD/quality/csg/3Q98/index.html>

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ABBREVIATIONS USED THROUGHOUT THE DOCUMENT

ASSY SITE :

Assembly Site

AIZ - Aizu, Japan
 AMT - Batam Island, Indonesia
 ANAM - Anam, Korea
 ANM(BC) - Buchon, Korea
 ANM(BY) - Bupyung, Korea
 ASE(K) - Kaohsiung, Taiwan
 ASE(M) - Penang, Malaysia
 ASTRA - Astra, Indonesia
 ATX - Austin, Texas
 CHAN - Chandler, Arizona
 CIT - Citizen Watch, Tanashi
 FUJITSU - Fujitsu Miyagi,
 Japan
 GDL - Mexico
 HTY - Hitachi Yonezawa,
 Yamagata, Japan
 KLM - Kuala Lumpur, Malaysia
 MCEL - Tianjin, China
 METL - Chung-Li, Taiwan
 MHT - Mitsui Kitakyushu, Japan
 MKL - Seoul, Korea
 NIC - Nihon Inter, Japan
 OHT - Oak Hill, Texas
 P1 - Profit Industrial Bldg.,
 Hong Kong
 ROHM - Fukuoka, Yukuhashi
 Japan
 SEN - Sendai, Japan
 SHC - Silicon Harbor Center,
 Hong Kong
 SKO - Shinko Denki, Japan
 STL - Swire, Hong Kong

FAB SITE :

Fabrication Site

BP1 - Mesa, Arizona
 BP2 - Mesa, Arizona
 BP3 - Mesa, Arizona
 BP4 - Toulouse, France
 IWATE - Sendai, Japan
 LGS1 - Gumi, Lucky Goldstar
 LGS2 - Cheong Ju, Lucky
 Goldstar
 MOS1 - East Kilbride, Scotland

MOS3 - Austin, Texas
 MOS5 - Mesa, Arizona
 MOS6 - Mesa, Arizona
 MOS7 - Aizu, Japan
 MS7A - Aizu, Japan
 MOS8 - Austin, Texas
 MOS9 - East Kilbride, Scotland
 MS10 - Irvine, California
 MS11 - Oakhill, Texas
 MS12 - Phoenix, Arizona
 MS13 - Austin, Texas
 MS15 - North Carolina
 MS20 - Toulouse, France
 ND - Nippon Denso; Aichi-Kota,
 Japan
 NWL - Newport Wales Limited
 PHX - Phoenix
 SEP - Seiko Epson, Japan
 THINK-O - Ibara, Japan
 TOWER - Migdal Haemek, Israel
 TSC - Sendai, Japan
 TSC8 - Sendai, Japan
 ZENER - Phoenix

VMFP - Very Mini Flat Pack
 WSOP - Wide SOP

Package Designators

D - SOP
 DW - WSOP
 EM/FJ/FC/FT/FG/FU - Plastic
 QFP
 F - MFP
 FE - Ceramic QFP
 FN - PLCC
 FTA - VQFP
 GC - Glob top BGA
 LFU, FTA - LQFP
 N - PDIP
 P - Plastic DIP
 PU/PV - TQFP
 RC - Ceramic PGA
 RP - Plastic PGA
 SP - SPDIP
 SVM - SVMFP
 VM, VF - VMFP
 ZP - Plastic BGA

PACKAGE: Package Type

BGA - Ball Grid Array
 CERDIP-Ceramic Dual In-Line
 Package
 LQFP - Low Profile QFP
 MFP - Mini Flat Pack
 PDIP - Plastic Dual In-line
 Package
 PGA - Pin Grid Array
 PLCC - Plastic Leaded Chip
 Carrier
 QFP - Quad Flat Pack
 SDIP - Shrink Dual In-line
 Package
 SPDIP - Shrink PDIP
 SOIC - Small Outline Integrated
 Circuits (150mils)
 SOP - Small Outline Package
 SOWB - SOIC Wide Body
 (300mils)
 SVMFP - Short very MFP
 TAB - Tape Automated Bonding
 TQFP - Thin Quad Flat Pack

Technology

SLM: Single Layer Metal
 DLM: Double Layer Metal
 TLM: Triple Layer Metal
 CMOS: Complimentary Metal Oxide
 Semiconductor
 HCMOS: High Density CMOS
 EEPROM: Electrical EPROM
 EPROM: Erasable Programmable
 Read Only Memory
 EPI: Epitaxial
 MOSAIC: Motorola Self Aligned IC
 MS1: MOSAIC 1
 MS15: MOSAIC 1.5
 STDLI: Standard Linear (Analog)



Technology Descriptions

HCMOS PROCESS

HCMOS stands for High Density Complementary Metal Oxide Semiconductor. It is used to describe the basic CMOS process (using both p-channel and n-channel MOSFET transistors) for a given shrink level. Devices with 1.0 micron and greater effective gate length are built using a single layer of polysilicon for transistors and interconnections, and a single layer of metal for both signal and power routing. Sub-micron devices may use one, two, or three layers of metal. Circuits built using this process are generally described as digital logic, including CPU's timers, SCI, SPI communications circuits, and RAM and ROM memory arrays.

DOUBLE POLY ANALOG PROCESS

This process employs a two different polysilicon layers, one for transistor gates and a second layer for analog components, such as capacitors. Metal usage is the same as described for HCMOS.

EPROM AND EEPROM PROCESS

EPROM and EEPROM devices use an electrically isolated (floating) poly-silicon gate to store charge for data retention as well as high voltage transistors for energy switching to the EPROM and/or EEPROM arrays. EEPROM devices contain an internal capacitive charge pump which boosts the 5 volt V_{DD} up to the necessary voltage to achieve tunneling required for programming the memory cells. EPROM devices use external power supplies to provide programming power. Both the EPROM and EEPROM processes are supersets of the double poly analog process.

CMOS AND HMOS PROCESSES

These processes are used for older generation devices. No new products are being introduced using these technologies. CMOS processes include both metal gate and polysilicon gate transistors while HMOS uses n-channel, polysilicon gate transistors. All devices built from this group using these two technologies are single layer polysilicon and single level metal, with the exception of HMOS EPROM micro-controllers which use two layers of polysilicon in the same manner as their HCMOS counterparts.

EPI85



EPI85 is a Bipolar Epitaxial process with the operating voltage not exceeding 30 Volts, limited to 20 Volts if any NPN transistor of the design is forced to a BV_{ce0} configuration.

EPI92

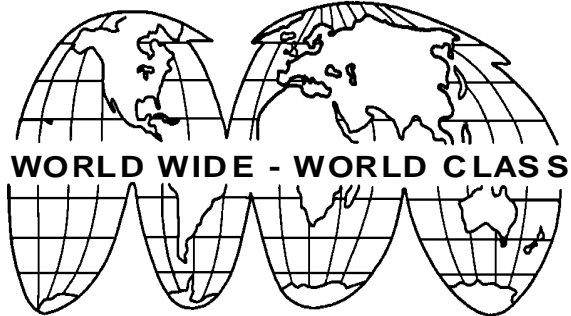
EPI92 is a Bipolar Epitaxial process with the operating voltage not exceeding 20 Volts, limited to 12 Volts if any NPN transistor of the design is forced to a BV_{ce0} configuration.

MOSAIC 1.5

MOSAIC is a Bipolar Analog process, with oxide isolation, Ion implantation of all dopants, and Master Mask Techniques associated. The maximum power supply of this process is 5 Volts.

SMARTMOS 2.5

SmartMOS 2.5 is a Power Bipolar, CMOS, DMOS process, having on the same chip dense logic, analog functions and one or several TMOS power transistors. It is well adapted to the automotive environment, with 60V blocking capability and a maximum current of 15A.



Section 2

Japan Monitor Center

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- Fabrication Cross Reference Table
- Assembly Cross Reference Table
- Reliability Data by Wafer Process
- Reliability Data by Package
- External Visual after Preconditioning
- Reliability Data by Device
- Failure Analysis



DEVICE CROSS REFERENCE TABLE

(1) WAFER PROCESS / DEVICE CROSS REFERENCE TABLE

MBG	PRODUCT	PTI CODE	WAFER FAB.	PROCESS TECHNOLOGY	
CSG	JLC1600FB	LWVB	TSC	HCMOS	0.65µmTLM
	MC141627FT	LHFT	TSC	HCMOS	0.8µmDLM
	MPC17A10SVM	LWAS	MOS7	ASMOS	2.0µmDLM
	MPC17A10SVM	LWAS	PSC	ASMOS	2.0µmDLM
	MPC17A50VM	LWAS	MS7A	ASMOS	2.0µmDLM
	MPC17A51FTA	LWAS	MS7A	ASMOS	1.75µmDLM
	MPC1825BVM	LWAS	MOS7	SMOSJ	4.0µmDLM
	MPC18A26VM	LWAS	MS7A	ASMOS	1.75µmDLM
	SC111250VM	LWAS	SEP	ASMOS	2.0µmDLM
	NCSG	MC145583VF	NARF	MOS7	CMOS
SC371080DW		NARH	MS7A	HCMOS	1.5µmDLM
SCG	MC74HC244AN	PKCH	PSC	-	-
	SC111019M	PHSZ	OMRON / MOS7	SE Process / TMOS	-
WSSG	MC145158F2	VWWN	MOS7	HCMOS	3.0µmSLM


(2) PACKAGE TYPE / DEVICE CROSS REFERENCE TABLE

MBG	PRODUCT	ASSY SITE	PACKAGE TYPE	MOLD COMPOUND	PRECONDITION FOR R.A.P.		
					MS LEVEL	HEAT CONDITION	
CSG	JLC1577VM	AIZ	VMFP36	MOT2000	1	220°C 60sec x3 (Oil)	
	MC141627FT	AIZ	LQFP48	CEL9200N	1	220°C 60sec x3 (Oil)	
	MC141628FU	AIZ	QFP32	CEL9000N	2	220°C 60sec x3 (Oil)	
	MC141628SP	AIZ	SPDIP32	CEL7700SX	-	260°C 10sec x1	
	MC14577CF	AIZ	MFP 8	CEL9000N	1	220°C 60sec x3 (Oil)	
	MC34119M	AIZ	MFP 8	CEL9000N	1	220°C 60sec x3 (Oil)	
	MC44200FT	AIZ	LQFP44	CEL9200N	2	220°C 60sec x3 (Oil)	
	MPC1718LFU	AIZ	LQFP44	CEL9200N	2	220°C 60sec x3 (Oil)	
	MPC17A10SVM	AIZ	SVMFP16	CEL9000N	1	220°C 60sec x3 (Oil)	
	MPC17A17DTB	AIZ	TSSOP16	CEL9000N	1	220°C 60sec x3 (Oil)	
	MPC17A34VM	AIZ	VMFP30	CEL9000N	1	220°C 60sec x3 (Oil)	
	MPC17A50VM	AIZ	VMFP36	MOT2000	1	220°C 60sec x3 (Oil)	
	MPC17A51VM	AIZ	VMFP36	MOT2000	1	220°C 60sec x3 (Oil)	
	MPC17A55FTA	AIZ	VQFP72	EME6600R	1	220°C 60sec x3 (Oil)	
	MPC1825BVM	AIZ	VMFP36	MOT2000	1	220°C 60sec x3 (Oil)	
	MPC18A26VM	AIZ	VMFP36	MOT2000	1	220°C 60sec x3 (Oil)	
	SC111250VM	AIZ	VMFP36	CEL9000N	1	220°C 60sec x3 (Oil)	
	SC111308FTA	AIZ	LQFP64	CEL9200N	1	240°C MAX x3 (IR)	
	SC77655SP	AIZ	SPDIP28	CEL7700SX	-	260°C 10sec x1	
	SC371053FTA	HTY	LQFP80	CEL9000N	1	220°C 60sec x3 (Oil)	
	JLC1557BFU	SEN	LQFP48	CEL4600N	1	240°C MAX x3 (IR)	
	JLC1600FB	SEN	QFP80	CEL9000N	2	220°C 60sec x3 (Oil)	
	NCSG	MC145406P	AIZ	PDIP16	ST10GH	-	260°C 10sec x1
		MC145407F	AIZ	MFP20	EME5000LS	1	220°C 60sec x3 (Oil)
		SC371080DW	METL	WSOP20	MP76H	1	220°C 60sec x3 (Oil)
		SC371080VF	AIZ	VMFP20	CEL9000N	1	220°C 60sec x3 (Oil)
		MC145583VF	MHT	VMFP28	EME6300HE	1	220°C 60sec x3 (Oil)
SCG	JBD1201ZU	AIZ	GTLCC80HS	CB013	1	240°C MAX x3 (IR)	
	JDX2001	AIZ	PDIP16	ST10GH	-	260°C 10sec x1	
	MC14066BF	AIZ	MFP14	EME5000LS	1	220°C 60sec x3 (Oil)	
	MC74HC244AN	AIZ	PDIP20	ST10F	-	260°C 10sec x1	
	MMQF2N06VL	AIZ	MFP20	EME5000LS	1	220°C 60sec x3 (Oil)	
	SC111019M	AIZ	MFP20	EME5000LS	1	220°C 60sec x3 (Oil)	
	SC111954D	AIZ	SOP 8	EME5000LS	1	220°C 60sec x3 (Oil)	
WSSG	SN74LS244N	AIZ	PDIP20	ST10F	-	260°C 10sec x1	
	MC145158F2	AIZ	MFP16	EME5000LS	1	220°C 60sec x3 (Oil)	
	SRFIC1521	AIZ	VQFP48	CEL9000N	-	-	
	MC145159VF1	MHT	VMFP20	EME6300H	1	220°C 60sec x3 (Oil)	

RELIABILITY AUDIT PROGRAM RESULTS

(1) Reliability Data by Wafer Process

WAFER FAB	Technology	Process	HTOL		Total Device Hours	FIT Rate	
			S/S	Rejects		70°C60%CL	70°C90%CL
MOS7	2.0µmDLM	ASMOS	45	0	1.99E+05	4599	11554
	3.0µmSLM	HCMOS	45	0	1.20E+06	760	1908
	4.0µmSLM	CMOS	90	0	3.99E+05	2300	5777
	4.0µmDLM	SMOSJ	90	0	1.40E+06	657	1651
MS7A	1.5µmDLM	HCMOS	45	0	1.99E+05	4599	11554
	1.75µmDLM	ASMOS	135	0	1.59E+06	575	1444
	2.0µmDLM	ASMOS	90	0	2.39E+06	383	963
OMRON / MOS7	-	SE Process / TMOS	45	0	1.20E+06	767	1926
PSC	2.0µmDLM	ASMOS	135	0	1.59E+06	575	1444
	2.2µmSLM	HSL	90	0	1.06E+06	866	2177
SEP	2.0µmDLM	ASMOS	90	0	1.40E+06	657	1651
TSC	0.65µmTLM	HCMOS	45	0	1.99E+05	4599	11554
	0.8µmDLM	HCMOS	90	2	2.39E+06	1299	2226
		TOTAL	1035	2	1.52E+07	204	350

(2) Reliability Data by Package

a. Temperature Humidity Bias (GTLCC80HS was performed static condition)

Assembly Site	Package Type	Mold Compound	THB Read Point		ACCUM FAIL %
			100cyc	1000cyc	
AIZ	GTLCC80HS	CB013	0/135	0/90	0.00
	SPDIP28	CEL7700SX	0/45	0/45	0.00
	VMFP20	CEL9000N	0/45	0/45	0.00
	VQFP72	EME6600R	0/45	0/45	0.00
HTY	LQFP80	CEL9000N	0/45	0/45	0.00
		TOTAL	0/315	0/270	0.00


b. Temperature Cycle

Assembly Site	Package Type	Mold Compound	T/C Read Point		ACCUM FAIL %
			100cyc	1000cyc	
AIZ	GTLCC80HS	CB013	0/135	0/90	0.00
	LQFP44	CEL9200N	0/310	3/90	0.97
	LQFP48	CEL9200N	5/90	19/85	26.67
	LQFP64	CEL9200N	0/225	0/45	0.00
	MFP 8	CEL9000N	0/315	0/45	0.00
	MFP14	EME5000LS	0/135	0/45	0.00
	MFP16	EME5000LS	0/45	0/45	0.00
	MFP20	EME5000LS	0/180	0/45	0.00
	PDIP16	ST10GH	0/360	0/90	0.00
	PDIP20	ST10F	0/270	0/45	0.00
	QFP32	CEL9000N	0/45	-	0.00
	SOP 8	EME5000LS	0/90	-	0.00
	SPDIP28	CEL7700SX	0/360	0/90	0.00
	SVMFP16	CEL9000N	0/225	0/45	0.00
	TSSOP16	CEL9000N	0/90	-	0.00
	VMFP20	CEL9000N	0/90	0/45	0.00
	VMFP30	CEL9000N	0/90	-	0.00
	VMFP36	CEL9000N	0/90	0/45	0.00
	VMFP36	MOT2000	0/392	0/212	0.00
	VQFP48	CEL9000N	0/75	0/45	0.00
VQFP72	EME6600R	0/135	0/45	0.00	
HTY	LQFP80	CEL9000N	0/90	0/45	0.00
METL	WSOP20	MP76H	0/45	-	0.00
MHT	VMFP20	EME6300HE	0/45	-	0.00
	VMFP28	EME6300HE	0/90	-	0.00
SEN	QFP80	CEL9000N	0/45	-	0.00
TOTAL			5/4062	22/1197	0.67



c. Autoclave

Assembly Site	Package Type	Mold Compound	Autoclave Read Point		ACCUM FAIL %
			96hrs	288hrs	
AIZ	LQFP44	CEL9200N	0/310	0/90	0.00
	LQFP48	CEL9200N	0/90	0/90	0.00
	LQFP64	CEL9200N	0/225	0/90	0.00
	MFP 8	CEL9000N	0/315	0/45	0.00
	MFP14	EME5000LS	0/135	0/45	0.00
	MFP16	EME5000LS	0/45	0/45	0.00
	MFP20	EME5000LS	2/180	0/45	1.11
	PDIP16	ST10GH	0/360	0/90	0.00
	PDIP20	ST10F	1/270	0/45	0.37
	QFP32	CEL9000N	0/45	-	0.00
	SOP 8	EME5000LS	0/90	-	0.00
	SPDIP28	CEL7700SX	0/270	0/90	0.00
	SPDIP32	CEL7700SX	0/90	-	0.00
	SVMFP16	CEL9000N	0/225	0/45	0.00
	TSSOP16	CEL9000N	0/90	-	0.00
	VMFP20	CEL9000N	0/90	0/45	0.00
	VMFP30	CEL9000N	0/90	-	0.00
	VMFP36	CEL9000N	0/90	0/45	0.00
	VMFP36	MOT2000	0/392	0/212	0.00
	VQFP48	CEL9000N	0/75	-	0.00
VQFP72	EME6600R	0/134	0/45	0.00	
HTY	LQFP80	CEL9000N	0/90	0/45	0.00
METL	WSOP20	MP76H	0/45	-	0.00
MHT	VMFP20	EME6300HE	0/45	-	0.00
	VMFP28	EME6300HE	0/90	-	0.00
SEN	LQFP48	CEL4600N	0/45	0/45	0.00
	QFP80	CEL9000N	0/45	-	0.00
TOTAL			3/3971	0/1157	0.08



(3) External Visual after Precondition for QFP

Assembly Site	Package Type	Mold Compound	Package Crack		ACCUM FAIL %
			Side	Back	
AIZ	LQFP44	CEL9200N	0/528	0/528	0.00
	LQFP64	CEL9200N	0/450	0/450	0.00
	QFP32	CEL9000N	0/90	0/90	0.00
	VQFP72	EME6600R	0/179	0/179	0.00
HTY	LQFP80	CEL9000N	0/90	0/90	0.00
SEN	LQFP48	CEL4600N	0/45	0/45	0.00
	QFP80	CEL9000N	0/90	0/90	0.00
TOTAL			0/1472	0/1472	0.00

(4) Reliability Data by Device

HTOL (125°C, VoprMAX, Dynamic)

MBG	Device Type	Wafer Fab	Wafer Process	Technology	#of LOT	168hrs	1008hrs	ACCUM%
CSG	JLC1600FB	TSC	HCMOS	0.65µmTLM	1	0/45	-	0.00
	MC141627FT	TSC	HCMOS	0.8µmDLM	2	2/90	0/88	2.22
	MPC17A10SVM	MOS7	ASMOS	2.0µmDLM	1	0/45	-	0.00
	MPC17A10SVM	PSC	ASMOS	2.0µmDLM	3	0/135	0/45	0.00
	MPC17A50VM	MS7A	ASMOS	2.0µmDLM	2	0/90	0/90	0.00
	MPC17A51VM	MS7A	ASMOS	1.75µmDLM	2	0/90	0/45	0.00
	MPC1825BVM	MOS7	SMOSJ	4.0µmDLM	2	0/90	0/45	0.00
	MPC18A26VM	MS7A	ASMOS	1.75µmDLM	1	0/45	-	0.00
	SC111250VM	SEP	ASMOS	2.0µmDLM	2	0/90	0/45	0.00
	NCSG	MC145583VF	MOS7	CMOS	4.0µmSLM	2	0/90	-
SC371080DW		MS7A	HCMOS	1.5µmDLM	1	0/45	-	0.00
SCG	SC111019M	OMRON / MOS7	SE Process / TMOS	-	1	0/45	0/45	0.00
WSSG	MC145158F2	MOS7	HCMOS	3.0µmSLM	1	0/45	0/45	0.00
TOTAL					21	2/945	0/448	0.21

HTOL (145°C, VoprMAX, Static)

MBG	Device Type	Wafer Fab	Wafer Process	Technology	#of LOT	168hrs	504hrs	ACCUM%
SCG	MC74HC244AN	PSC	HSL	2.2µmSLM	2	0/90	-	0.00
TOTAL					2	0/90	-	0.00

**MOTOROLA****SEMICONDUCTOR PRODUCTS SECTOR**

TEMPERATURE HUMIDITY BIAS WITH PRECONDITIONING (JBD1201ZU was not biased)

MBG	Device Type	Package Type	Assy Site	Mold Compound	#of LOT	168hrs	1008hrs	ACCUM%
CSG	MPC17A55FTA	VQFP72	AIZ	EME6600R	1	0/45	0/45	0.00
	SC77655SP	SPDIP28	AIZ	CEL7700SX	1	0/45	0/45	0.00
	SC371053FTA	LQFP80	HTY	CEL9000N	1	0/45	0/45	0.00
NCSG	SC371080VF	VMFP20	AIZ	CEL9000N	1	0/45	0/45	0.00
SCG	JBD1201ZU	GTLCC80HS	AIZ	CB013	3	0/135	0/90	0.00
TOTAL					7	0/315	0/270	0.00

TEMPERATURE CYCLE WITH PRECONDITIONING

MBG	Device Type	Package Type	Assy Site	Mold Compound	#of LOT	100cyc	1000cyc	ACCUM%
CSG	JLC1577VM	VMFP36	AIZ	MOT2000	1	0/32	0/32	0.00
	MC141627FT	LQFP48	AIZ	CEL9200N	2	5/90	19/85	26.67
	MC141628FU	QFP32	AIZ	CEL9000N	1	0/45	-	0.00
	MC141628SP	SPDIP32	AIZ	CEL7700SX	2	0/90	-	0.00
	MC14577CF	MFP 8	AIZ	CEL9000N	2	0/90	0/45	0.00
	MC34119M	MFP 8	AIZ	CEL9000N	5	0/225	-	0.00
	MC44200FT	LQFP44	AIZ	CEL9200N	5	0/220	3/90	1.36
	MPC1718LFU	LQFP44	AIZ	CEL9200N	2	0/90	-	0.00
	MPC17A10SVM	SVMFP16	AIZ	CEL9000N	5	0/225	0/45	0.00
	MPC17A17DTB	TSSOP16	AIZ	CEL9000N	2	0/90	-	0.00
	MPC17A34VM	VMFP30	AIZ	CEL9000N	2	0/90	-	0.00
	MPC17A50VM	VMFP36	AIZ	MOT2000	3	0/135	0/90	0.00
	MPC17A51VM	VMFP36	AIZ	MOT2000	2	0/90	0/45	0.00
	MPC17A55FTA	VQFP72	AIZ	EME6600R	3	0/135	0/45	0.00
	MPC1825BVM	VMFP36	AIZ	MOT2000	2	0/90	0/45	0.00
	MPC18A26VM	VMFP36	AIZ	MOT2000	1	0/45	-	0.00
	SC111250VM	VMFP36	AIZ	CEL9000N	2	0/90	0/45	0.00
	SC111308FTA	LQFP64	AIZ	CEL9200N	5	0/225	0/45	0.00
	SC77655SP	SPDIP28	AIZ	CEL7700SX	6	0/270	0/90	0.00
	SC371053FTA	LQFP80	HTY	CEL9000N	2	0/90	0/45	0.00
JLC1600FB	QFP80	SEN	CEL9000N	1	0/45	-	0.00	
NCSG	MC145406P	PDIP16	AIZ	ST10GH	1	0/45	-	0.00
	MC145407F	MFP20	AIZ	EME5000LS	2	0/90	-	0.00
	SC371080VF	VMFP20	AIZ	CEL9000N	2	0/90	0/45	0.00
	SC371080DW	WSOP20	METL	MP76H	1	0/45	-	0.00
	MC145583VF	VMFP28	MHT	EME6300HE	2	0/90	-	0.00
SCG	JBD1201ZU	GTLCC80HS	AIZ	CB013	3	0/135	0/90	0.00
	JDX2001	PDIP16	AIZ	ST10GH	7	0/315	0/90	0.00
	MC14066BF	MFP14	AIZ	EME5000LS	3	0/135	0/45	0.00
	MC74HC244AN	PDIP20	AIZ	ST10F	2	0/90	-	0.00
	MMQF2N06VL	MFP20	AIZ	EME5000LS	1	0/45	-	0.00
	SC111019M	MFP20	AIZ	EME5000LS	1	0/45	0/45	0.00
	SC111954D	SOP 8	AIZ	EME5000LS	2	0/90	-	0.00



	SN74LS244N	PDIP20	AIZ	ST10F	4	0/180	0/45	0.00
WSSG	MC145158F2	MFP16	AIZ	EME5000LS	1	0/45	0/45	0.00
	SRFIC1521	VQFP48	AIZ	CEL9000N	2	0/75	0/45	0.00
	MC145159VF1	VMFP20	MHT	EME6300HE	1	0/45	-	0.00
TOTAL					91	5/4067	22/1197	0.67

AUTOCLAVE WITH PRECONDITIONING

MBG	Device Type	Package Type	Assy Site	Mold Compound	#of LOT	96hrs	288hrs	ACCUM%
CSG	JLC1577VM	VMFP36	AIZ	MOT2000	1	0/32	0/32	0.00
	MC141627FT	LQFP48	AIZ	CEL9200N	2	0/90	0/90	0.00
	MC141628FU	QFP32	AIZ	CEL9000N	1	0/45	-	0.00
	MC141628SP	SPDIP32	AIZ	CEL7700SX	2	0/90	-	0.00
	MC14577CF	MFP 8	AIZ	CEL9000N	2	0/90	0/45	0.00
	MC34119M	MFP 8	AIZ	CEL9000N	5	0/225	-	0.00
	MC44200FT	LQFP44	AIZ	CEL9200N	5	0/220	0/90	0.00
	MPC1718LFU	LQFP44	AIZ	CEL9200N	2	0/90	-	0.00
	MPC17A10SVM	SVMFP16	AIZ	CEL9000N	5	0/225	0/45	0.00
	MPC17A17DTB	TSSOP16	AIZ	CEL9000N	2	0/90	-	0.00
	MPC17A34VM	VMFP30	AIZ	CEL9000N	2	0/90	-	0.00
	MPC17A50VM	VMFP36	AIZ	MOT2000	3	0/135	0/90	0.00
	MPC17A51VM	VMFP36	AIZ	MOT2000	2	0/90	0/45	0.00
	MPC17A55FTA	VQFP72	AIZ	EME6600R	3	0/134	0/45	0.00
	MPC1825BVM	VMFP36	AIZ	MOT2000	2	0/90	0/45	0.00
	MPC18A26VM	VMFP36	AIZ	MOT2000	1	0/45	-	0.00
	SC111250VM	VMFP36	AIZ	CEL9000N	2	0/90	0/45	0.00
	SC111308FTA	LQFP64	AIZ	CEL9200N	5	0/225	0/45	0.00
	SC77655SP	SPDIP28	AIZ	CEL7700SX	6	0/270	0/90	0.00
	SC371053FTA	LQFP80	HTY	CEL9000N	2	0/90	0/45	0.00
	JLC1557BFU	LQFP48	SEN	CEL4600N	1	0/45	0/45	0.00
	JLC1600FB	QFP80	SEN	CEL9000N	1	0/45	-	0.00
NCSG	MC145406P	PDIP16	AIZ	ST10GH	1	0/45	-	0.00
	MC145407F	MFP20	AIZ	EME5000LS	2	0/90	-	0.00
	SC371080VF	VMFP20	AIZ	CEL9000N	2	0/90	0/45	0.00
	SC371080DW	WSOP20	METL	MP76H	1	0/45	-	0.00
	MC145583VF	VMFP28	MHT	EME6300HE	2	0/90	-	0.00
SCG	JDX2001	PDIP16	AIZ	ST10GH	7	0/315	0/90	0.00
	MC14066BF	MFP14	AIZ	EME5000LS	3	0/135	0/45	0.00
	MC74HC244AN	PDIP20	AIZ	ST10F	2	0/90	-	0.00
	MMQF2N06VL	MFP20	AIZ	EME5000LS	1	2/45	-	4.44
	SC111019M	MFP20	AIZ	EME5000LS	1	0/45	0/45	0.00
	SC111954D	SOP 8	AIZ	EME5000LS	2	0/90	-	0.00
	SN74LS244N	PDIP20	AIZ	ST10F	4	1/180	0/45	0.56
WSSG	MC145158F2	MFP16	AIZ	EME5000LS	1	0/45	0/45	0.00
	SRFIC1521	VQFP48	AIZ	CEL9000N	2	0/75	-	0.00
	MC145159VF1	VMFP20	MHT	EME6300HE	1	0/45	-	0.00
TOTAL					89	3/3971	0/1112	0.08



FAILURE ANALYSIS

All failures are analyzed by Product Analysis Lab. In AIZU plant. After that, will be decide action items and schedule by discussion with all concerned organization members.

Failure Summary

DEVICE	MBG	WAFER FAB	WAFER PROCESS TECHNOLOGY
MC141627FT	CSG	TSC	0.8umDLM

HTOL 168hrs 2/90pcs failed.

One device failure caused by inner lead – 2nd neck or stitch – damage (CATS#196250A, 196252A).

Another one device failure caused is not cleared (CATS#197399A),

DEVICE	MBG	ASSY SITE	PACKAGE TYPE
MC141627FT	CSG	AIZ	LQFP48 (CEL9200N)

T/C 100cyc 5/90pcs, 1000cyc 19/85pcs failed.

All failure caused by inner lead – 2nd neck or stitch – damage (CATS#196250A, 196252A, 198882A, 204066A).

DEVICE	MBG	ASSY SITE	PACKAGE TYPE
MC44200FT	CSG	AIZ	LQFP44 (CEL9200N)

T/C 1000cyc 3/90pcs failed.

Two device failure caused by inner lead – 2nd neck – damage (CATS#206363A).

Another one device failure caused is not cleared (CATS#210915A),

DEVICE	MBG	ASSY SITE	PACKAGE TYPE
MMQF2N06VL	SCG	AIZ	MFP20 (EME5000LS)

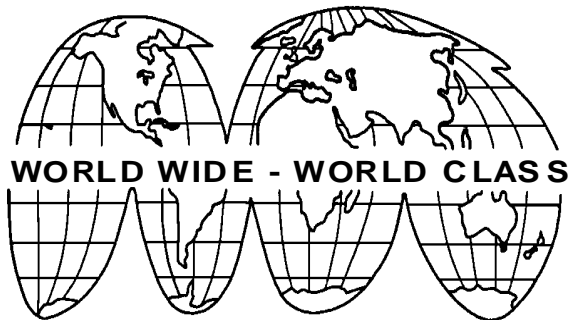
AUTOCLAVE 96hrs 2/45pcs failed.

All failure caused by pad corrosion (CATS#184813A).

DEVICE	MBG	ASSY SITE	PACKAGE TYPE
SN74LS244N	SCG	AIZ	PDIP20 (ST10F)

AUTOCLAVE 96hrs 1/45pcs failed.

Failure caused by pad corrosion (CATS#204082A).



Section 3

Hong Kong, Malaysia, U.S. Monitor Centers

Prepared by Andrea Musat

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This section included data obtained through Hong Kong reliability center from Sam-Cheung and the KLM reliability center from Said Nazri.

- Device Cross Reference Table
- FITs Level by Technology
- Reliability Data by Package
- Reliability Data by Device
- Failure Analysis



Device Cross Reference Table

Imaging and Entertainment Solutions

(formerly Imaging Systems Division)

Part Number	Mask	Fab Site	Design Rule
414256	G78K	MOS 10	0.65 μ DLM
414277	G61B	MOS8	0.65 μ TLM
414294	G85K	MOS8	0.65 μ TLM
414339	G97K	MOS8	0.65 μ TLM
414355	J21C	MS11	0.42 μ TLM
414361	H18H	MS11	0.42 μ TLM
414362	H11H	MOS8	0.65 μ TLM
414379	J89C	TSC8	0.65 μ TLM
56004	H70G	MOS10	0.65 μ DLM
56007	J52E	TSC8	0.65 μ DLM
56009	J89E	TSC8	0.55 μ DLM
56009	H30H	MOS10	0.65 μ DLM
56012	G61E	TSC8	0.55 μ DLM
56362	H76G	MOS 13	0.34 μ TLM

Networking & Computing Systems Group

(Many products moved to this group from Imaging Systems Division in 4Q98)

Part Number	Mask	Fab Site	Design Rule
5204	H20D	MOS11	0.34 μ TLM
5204	H14N	MOS13	0.34 μ TLM
5206	G10J	MOS8	0.65 μ TLM
5206e	J22G	MOS13	0.34 μ TLM
5307	H39G	MOS13	0.42 μ TLM
5307	H55J	MOS13	0.34 μ TLM
56301	F48S	MOS11	0.5 μ TLM
56303	H82G	MOS13	0.34 μ TLM
56303	J22A	MOS11	0.42 μ TLM
68HC000/1	E72N	MOS8	0.8 μ DLM
68EC000	G74K	MOS10	0.8 μ DLM
68SEC000	G78K	MOS10	0.65 μ DLM
68SEC000	G47B	MOS8	0.65 μ DLM
68020	E30G	TSC	1.0 μ SLM
68EC020	E13G	TSC	1.0 μ DLM
68030	F91C	TSC	1.0 μ SLM
68EC030	G40W	MOS8	0.8 μ SLM
68040	E42K	MOS11	0.65 μ DLM
68EC/LC040	E71M	MOS11	0.65 μ DLM
68060	F43G	MOS11	0.5 μ TLM
68EC/LC060	G59Y	MOS11	0.42 μ TLM
68302	F26E	MOS11	0.65 μ DLM



68EC/LC302	J29A	MOS11	0.55 μ DLM
68EN302	H74P	MOS11	0.65 μ DLM
68306	E94M	MOS8	0.8 μ TLM
68306	G71K	MOS8	0.65 μ TLM
68307	G57B	MOS8	0.8 μ TLM
68322	F65E	MOS8	0.8 μ TLM
68322	G59B	MOS8	0.65 μ TLM
68328	G58E	MOS8	0.65 μ TLM
68328	H58B	MOS8	0.65 μ TLM
68328	H51K	TSC	0.65 μ TLM
68332 (TSG)	J30C	TSC8	0.65 μ DLM
68340	G67F	MOS11	0.65 μ DLM
68340	H37T	TSC8	0.65 μ DLM
68341	E41R	MOS8	0.8 μ TLM
68349	F13C	MOS8	0.8 μ TLM
68360	J17A	MOS11	0.55 μ TLM
68360	E68C	MOS11	0.65 μ TLM
68MH360	F83S	MOS11	0.65 μ TLM
68HC681	G76K	MOS8	0.65 μ TLM
68882	C12R	MOS8	1.0 μ SLM
68HC901	F21P	MOS8	0.65 μ DLM
823	F98S	MOS11	0.42 μ TLM
823/850	H89G	MOS11	0.34 μ TLM
860	J24A	MOS11	0.42 μ TLM
860	F84C	MOS11	0.5 μ TLM



Reliability Audit Program (RAP) Results

(I) High Temperature Operating Life Test's FITs Level by Technology:

(This section includes results from the last one year of monitor testing for each fabrication process family. Individual device data is shown in Part-3.)

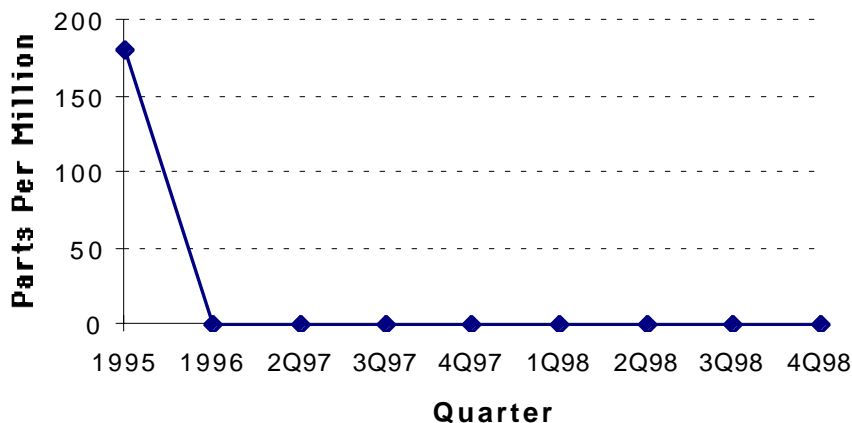
Process Family	Readpoints # Failures / Sample Size				Total Device Hours *	FIT Rate	
	24 Hrs	168 Hrs	504 Hrs	1008 Hrs		70°C 90% CL	55°C 60% CL
1.0-1.5 μ	0/460	0/460	0/460	0/460	4.64e+05	932 FIT	153 FIT
0.7-0.8 μ	0/1270	1/790	0/602	0/437	5.67e+05	329 FIT	60 FIT
0.65 μ	0/1416	2/1416	0/1163	0/950	1.11e+06	356 FIT	76 FIT
0.3 -0.55 μ	----	15/3827	2/3033	1/2579	2.96e+06	975 FIT	305 FIT

* As production of older technologies ramps down, the total device hours collected during monitor testing is reduced, thus resulting in an increased FIT rate (particularly when device hours are less than 1E6).

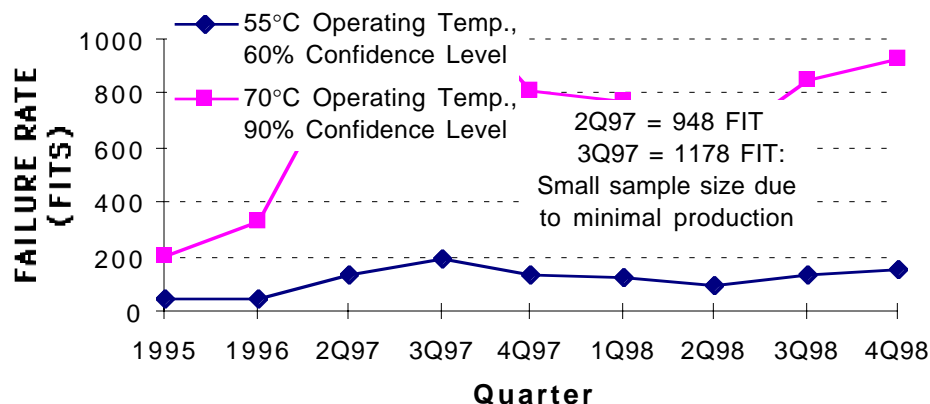
The fit rate for the 0.3 - 0.55 μ m technology is particularly higher than previous quarter's data due to the performance of one particular part in one fab. Corrective actions are being pursued. Excluding this part from the analysis, FIT is 119 at 60% C.L. and 437 at 90% C.L.

1.0μ-1.5μ Process Family Failure Rate Trends

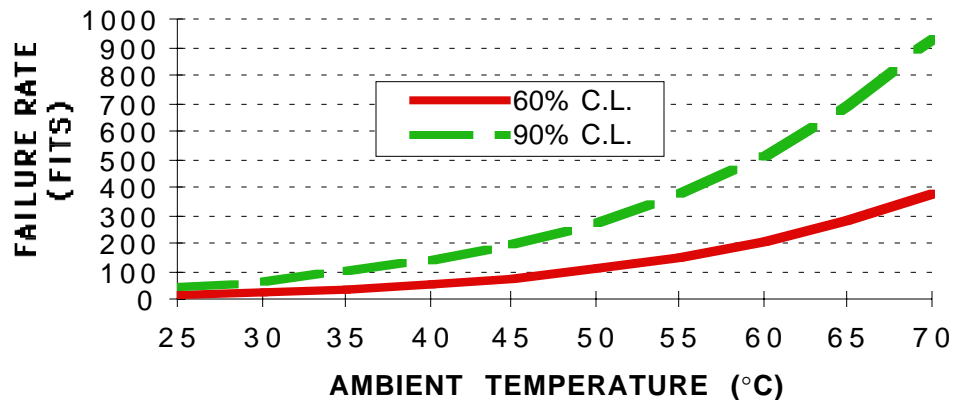
Early Life Failure Rate Trend (PPM)



Intrinsic Failure Rate Trend (FITs)

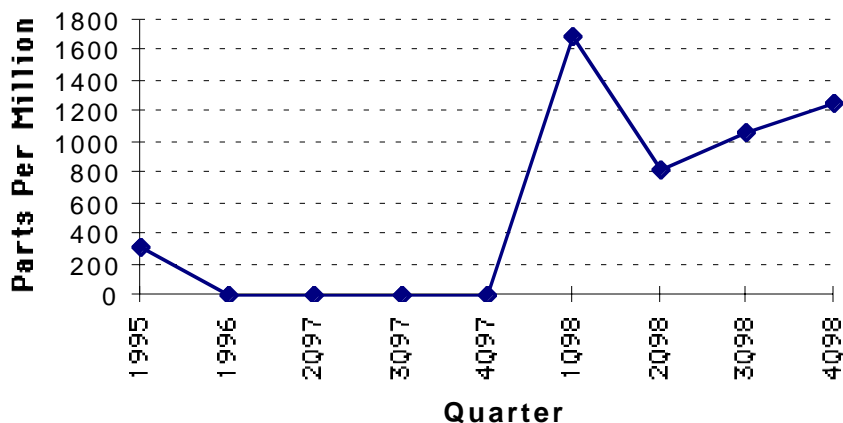


Failure Rate as a Function of Operating Temperature



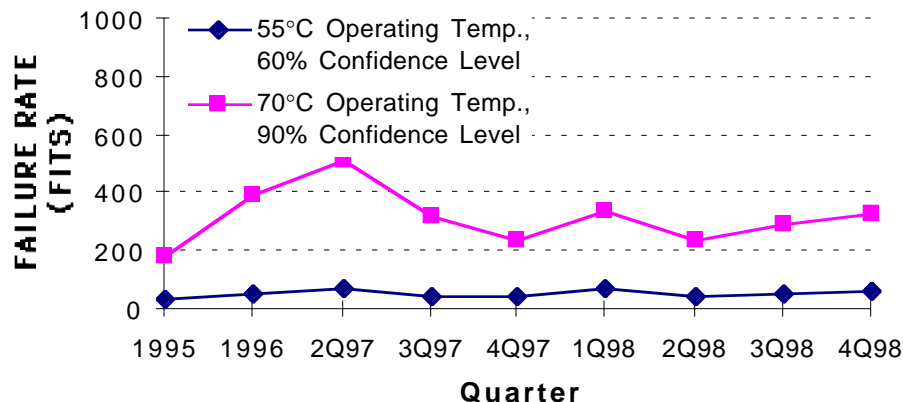


Early Life Failure Rate Trend (PPM)

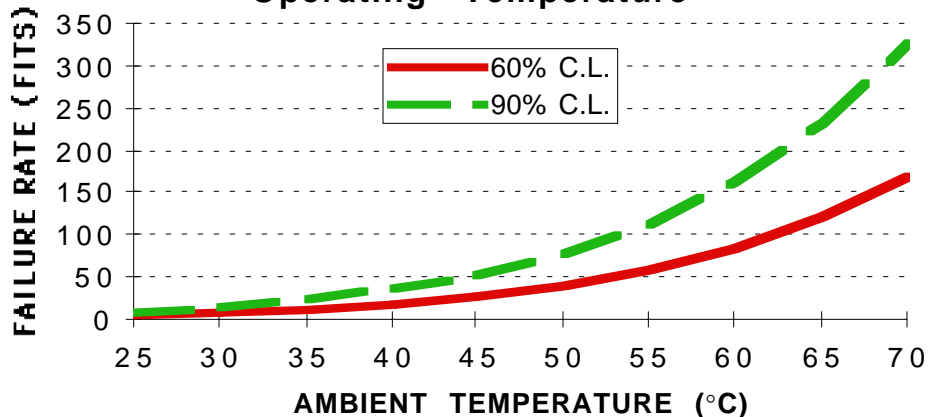


0.7 μ -0.8 μ Process
Family Failure Rate
Trends

Intrinsic Failure Rate Trend (FITs)



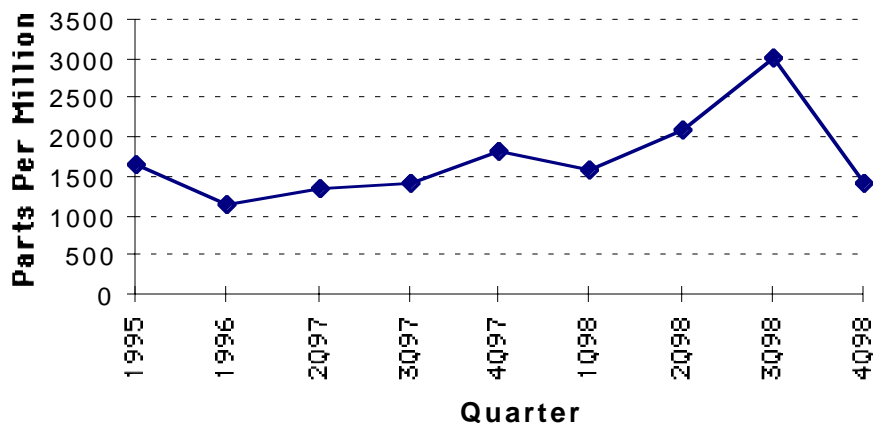
Failure Rate as a Function of Operating Temperature



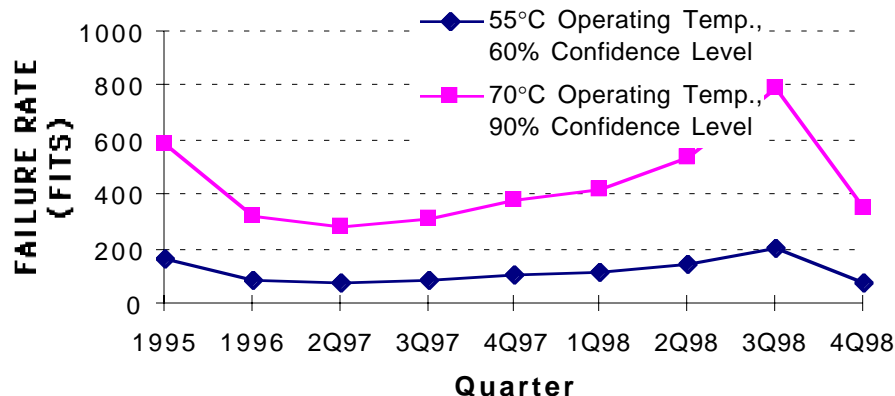


0.65 μ Process
Family Failure Rate
Trends

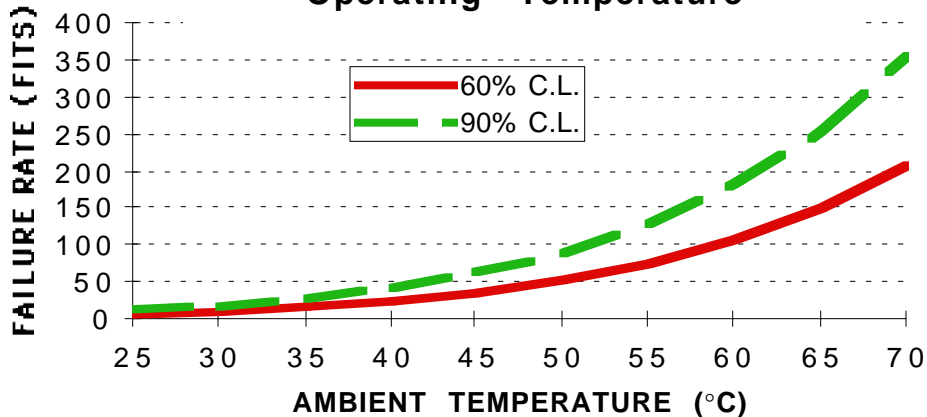
Early Life Failure Rate Trend (PPM)

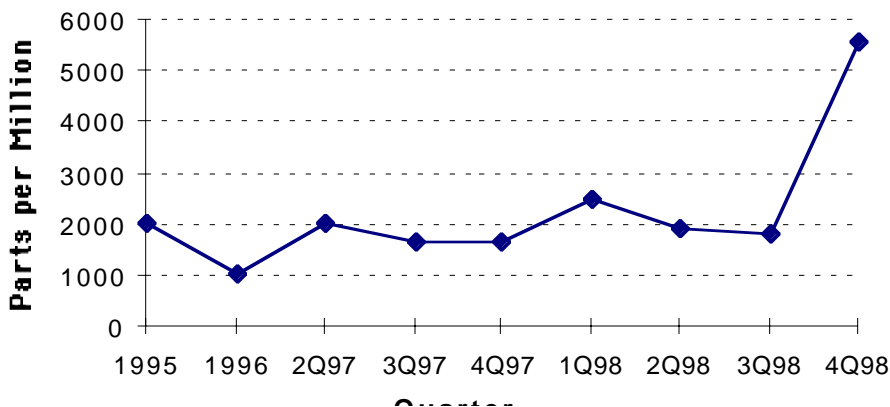


Intrinsic Failure Rate Trend (FITs)



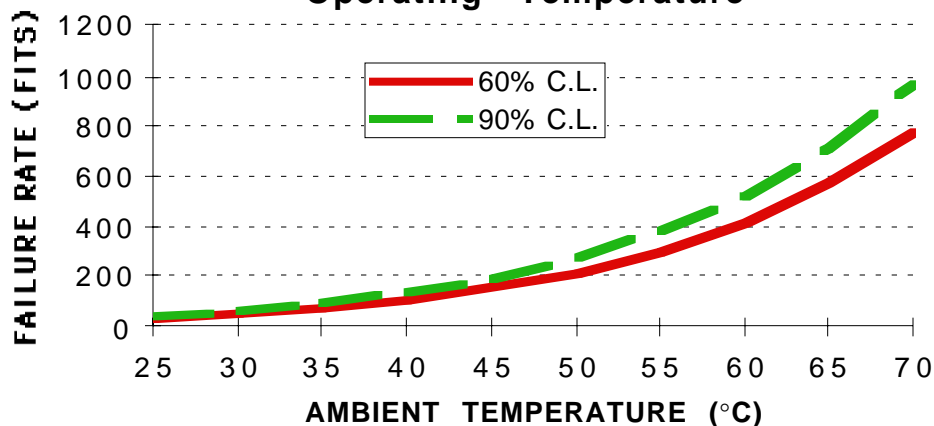
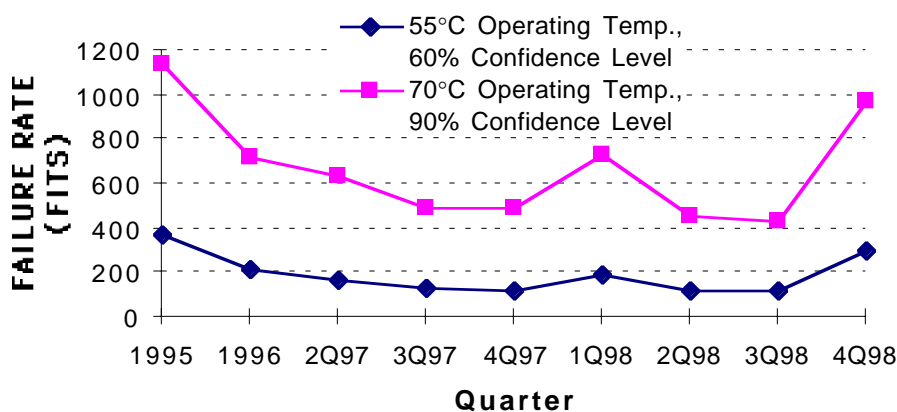
Failure Rate as a Function of Operating Temperature



Early Life Failure Rate Trend (PPM)


0.3 μ -0.55 Process Family Failure Rate Trends

The fit rate for the 0.3 - 0.55 μ m technology is particularly higher than previous quarter's data due to the performance of one particular part in one fab. Corrective actions are being pursued. Excluding this part from the analysis, FIT is 119 at 60% C.L. and 437 at 90% C.L.

Failure Rate as a Function of Operating Temperature

Intrinsic Failure Rate Trend (FITs)




(II) Reliability Data by Package:

(Sample sizes and results in this section include the last one year of cumulated monitor data. Individual device data is shown in Part-3.)

PQFP Reliability Test Data

(Level-1 or Level-3 preconditioning is performed prior to these reliability stresses. Please see the individual device data for specific information.)

Stress Test	Readpoints				% Failures
	# Failures / Sample Size				
Temperature Cycling (-65°C/+150°C)	Precond	100 Cy	500 Cy	1000 Cy	0%
	0/2086	0/2085	0/1480	0/981	
Temperature Humidity Bias (85°C,85%RH)	Precond	168 Hrs	504 Hrs	1008 Hrs	0%
	0/496	0/498	0/486	0/438	
Autoclave (121°C, 100%RH, 15 psig)	Precond	48 Hrs	144 Hrs	- - -	0.11%
	0/1861	2/1861	0/1425	- - -	

TQFP Reliability Test Data

(Level-1, Level-3, or Level-4 preconditioning is performed prior to these reliability stresses. Please see the individual device data for specific information.)

Stress Test	Readpoints				% Failures
	# Failures / Sample Size				
Temperature Cycling (-65°C/+150°C)	Precond	100 Cy	500 Cy	1000 Cy	0%
	0/556	0/552	0/278	0/201	
Autoclave (121°C, 100%RH, 15 psig)	Precond	48 Hrs	144 Hrs	- - -	0%
	0/231	0/231	0/231	- - -	

CQFP Reliability Test Data

Stress Test	Readpoints			% Failures
	# Failures / Sample Size			
Temperature Cycling (-65°C/+150°C)	100 Cy	500 Cy	1000 Cy	0%
	0/360	0/360	- - -	

PLCC Reliability Test Data

(Level-3 preconditioning is performed prior to these reliability stresses.)

Stress Test	Readpoints				% Failures
	# Failures / Sample Size				
Temperature Cycling (-65°C/+150°C)	Precond	100 Cy	500 Cy	1000 Cy	0%
	0/822	0/822	0/792	- - -	
Autoclave (121°C, 100%RH, 15 psig)	Precond	48 Hrs	144 Hrs	- - -	0%
	0/820	0/820	0/820	- - -	

CPGA Reliability Test Data

Stress Test	Readpoints			% Failures
	# Failures / Sample Size			
Temperature Cycling (-65°C/+150°C)	100 Cy	500 Cy	1000 Cy	0%
	0/360	0/360	- - -	



PBGA Reliability Test Data

Stress Test	Readpoints # Failures / Sample Size				% Failures
	Precond	100 Cy	500 Cy	1000 Cy	
Temperature Cycling (-65°C/+150°C)	0/460	0/459	0/384	1/382	0.22%
	Precond	168 Hrs	504 Hrs	1008 Hrs	
Temperature Humidity Bias (85°C,85%RH)	0/305	0/305	0/153	0/152	0%
	Precond	48 Hrs	144 Hrs	- - -	
Autoclave (121°C, 100%RH, 15 psig)	0/1097	0/1096	2/740	- - -	0.18%



(III) Reliability Data by Device

Life Test Data

DEVICE	LEFF	FAB	ASSY	PKG	DATE	READ POINTS: FAILS/SS			
						24 HRS	168 HRS	504 HRS	1008 HRS
414355	0.42	MS11	ASTRA	FT	N/A	0 / 77	0 / 77	- / -	- / -
414355	0.42	MS11	ASTRA	FT	N/A	0 / 77	0 / 77	0 / 77	0 / 77
414355	0.42	MS11	ASTRA	FT	N/A	0 / 77	0 / 77	0 / 77	0 / 77
414355	0.42	MS11	ASTRA	FT	N/A	0 / 77	0 / 77	- / -	- / -
414361	0.42	MS11	ASAT	EM	9807	0 / 87	0 / 87	0 / 82	0 / 74
414361	0.42	MS11	ASAT	EM	N/A	0 / 80	0 / 80	- / -	- / -
414379	0.65	MOS8	ANAM	PU	9816	0 / 77	0 / 77	0 / 77	- / -
414294	0.65	MOS8	ANAM	FT	9714	0 / 76	0 / 76	0 / 74	0 / 73
414294	0.65	MOS8	ANAM	FT	9718	0 / 79	0 / 79	0 / 79	0 / 79
414294	0.65	TSC8	ANAM	FT	9842	0 / 48	0 / 48	0 / 47	0 / 47
414294	0.65	TSC8	ANAM	FT	9842	0 / 48	0 / 48	0 / 48	- / -
414294	0.65	TSC8	ANAM	FT	9842	0 / 48	0 / 48	0 / 48	0 / 48
414362	0.65	MOS8	SHC	FT	9714	0 / 77	1 / 77	0 / 76	0 / 76
5204	0.34	MS13	SHC	PU	9804	0 / 90	0 / 90	1 / 83	- / -
5204	0.34	MS13	SHC	PU	9736	0 / 104	0 / 104	1 / 104	0 / 103
5204	0.34	MS13	SHC	PU	9735	0 / 100	0 / 100	0 / 100	0 / 100
5204	0.34	MS13	SHC	PU	9736	0 / 100	0 / 100	0 / 100	0 / 96
5204	0.34	MS13	SHC	PU		0 / 100	0 / 100	0 / 100	0 / 100
5204	0.34	MS13	SHC	PU	9746	0 / 100	0 / 100	0 / 100	0 / 99
5204	0.34	MS11	SHC	PU	9804	0 / 99	0 / 99	0 / 99	- / -
5206e	0.34	MS13	OHT	FT	N/A	0 / 77	0 / 77	0 / 77	0 / 77
5307	0.42	MS13	SKO	FT	9809	0 / 77	0 / 77	0 / 77	0 / 77
5307	0.42	MS13	SKO	FT	9809	0 / 77	0 / 77	0 / 76	0 / 76
5307	0.42	MS13	SKO	FT	9809	0 / 75	0 / 75	0 / 73	0 / 73
56007	0.65	TSC8	SHC	FJ	9805	0 / 77	0 / 77	0 / 77	0 / 77
56007	0.65	TSC8	SHC	FJ	9829	0 / 78	0 / 78	0 / 78	0 / 78
56009	0.55	TSC8	P1	FJ	9810	0 / 77	1 / 77	0 / 76	0 / 76
56009	0.55	TSC8	P1	FJ	9811	0 / 74	0 / 74	0 / 74	0 / 74
56009	0.55	TSC8	P1	FJ	9814	0 / 77	0 / 77	0 / 76	0 / 76
56009	0.65	MS10	SHC	FU	9810	0 / 84	0 / 84	- / -	- / -
56009	0.65	MS10	SHC	FU		0 / 82	0 / 82	- / -	- / -
56009	0.65	MS10	SHC	FU		0 / 83	0 / 83	- / -	- / -
56012	0.55	TSC8	SHC	FV	9751	0 / 77	0 / 77	0 / 77	0 / 77
56303	0.34	MS13	KLM	PV	9820	0 / 77	0 / 77	0 / 77	0 / 77
56303	0.34	MS13	KLM	PV	9821	0 / 77	0 / 77	0 / 77	0 / 77
56303	0.34	MS13	KLM	PV	9824	0 / 20	0 / 20	0 / 19	0 / 19
56303	0.34	MS13	KLM	PV	9824	0 / 77	0 / 77	0 / 77	0 / 76
56303	0.42	MS11	KLM	PV	9751	0 / 77	1 / 77	0 / 76	1 / 75



Life Test Data (continued)

DEVICE	LEFF	FAB	ASSY	PKG	DATE	READ POINTS: FAILS/SS			
						24 HRS	168 HRS	504 HRS	1008 HRS
56362	0.34	MS13	SHC	PV	9802	0 / 76	0 / 76	- / -	- / -
56362	0.34	MS13	SHC	PV	9746	0 / 76	0 / 76	- / -	- / -
56362	0.34	MS13	SHC	PV	9803	0 / 77	0 / 77	- / -	- / -
68HC000	0.8	MS10	KLM	FN	9802	0 / 170	1 / 170	- / -	- / -
68HC000	0.8	MOS8	KLM	FN	9823	0 / 48	- / -	- / -	- / -
68HC000	0.8	MOS8	KLM	FN	9823	0 / 48	- / -	- / -	- / -
68HC000	0.8	MOS8	KLM	FN	9823	0 / 48	- / -	- / -	- / -
68HC000	0.8	MOS8	KLM	FN	9823	0 / 48	- / -	- / -	- / -
68HC000	0.8	MOS8	KLM	FN	9823	0 / 48	- / -	- / -	- / -
68HC000	0.8	MS10	KLM	FN	9817	0 / 48	0 / 48	0 / 48	0 / 48
68HC000	0.8	MS10	KLM	FN	9825	0 / 48	- / -	- / -	- / -
68HC000	0.8	MS10	KLM	FN	9825	0 / 48	- / -	- / -	- / -
68HC000	0.8	MS10	KLM	FN	9825	0 / 48	- / -	- / -	- / -
68HC000	0.8	MS10	KLM	FN	9819	0 / 48	0 / 48	0 / 48	0 / 48
68HC000	0.8	MS10	KLM	FN	9836	0 / 48	0 / 48	0 / 48	0 / 48
68HC000	0.8	TSC	KLM	FN	9833	0 / 77	0 / 77	0 / 77	0 / 77
68HC000	0.8	MOS8	KLM	FN	9836	0 / 48	0 / 48	0 / 48	0 / 48
68HC000	0.8	MOS8	KLM	FN	9843	0 / 48	0 / 48	0 / 48	0 / 48
68HC000	0.8	MOS8	KLM	FN	9844	0 / 48	0 / 48	0 / 48	0 / 48
68HC000	0.8	MOS8	KLM	FN	9848	0 / 48	0 / 48	0 / 48	0 / 48
68HC000	0.8	MS10	KLM	FN	9808	0 / 48	0 / 48	0 / 30	- / -
68HC000	0.8	MS10	KLM	FN	9747	0 / 135	0 / 135	0 / 135	- / -
68HC000I	0.8	MS10	KLM	FN	9822	0 / 48	- / -	- / -	- / -
68SEC000	0.65	MS10	KLM	FN	9817	0 / 96	1 / 96	0 / 96	0 / 96
68SEC000	0.65	TSC8	KLM	FN	9835	0 / 77	0 / 77	0 / 77	0 / 77
68SEC000	0.65	MOS8	KLM	FN	9831	0 / 75	0 / 75	0 / 75	0 / 75
68SEC000	0.65	MS10	KLM	FN	9844	0 / 48	0 / 48	0 / 48	0 / 48
68SEC000	0.65	MS10	KLM	FN	9844	0 / 48	0 / 48	0 / 48	0 / 48
68SEC000	0.65	MS10	KLM	FN	9849	0 / 48	0 / 48	0 / 48	0 / 48
68020	1.0	TSC	KLM	RC	9816	0 / 28	0 / 28	0 / 28	0 / 28
68020	1.0	TSC	KLM	FE	9827	0 / 48	0 / 48	0 / 48	0 / 48



MOTOROLA

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Life Test Data (continued)

DEVICE	LEFF	FAB	ASSY	PKG	DATE	READ POINTS: FAILS/SS			
						24 HRS	168 HRS	504 HRS	1008 HRS
68EC060	0.42	MS11	KLM	RC	9835	0 / 45	0 / 45	0 / 45	0 / 45
68EC060	0.42	MS11	KLM	RC	9838	0 / 200	3 / 200	0 / 50	- / -
68LC060	0.42	MS11	ASAT	ZU	9743	0 / 76	0 / 76	0 / 76	0 / 63
68LC060	0.42	MS11	ASAT	ZU	9743	0 / 77	0 / 77	0 / 77	0 / 77
68LC060	0.42	MS11	ASAT	ZU	9743	0 / 77	0 / 77	0 / 77	0 / 77
68LC060	0.42	MS11	KLM	ZU	9806	0 / 77	0 / 77	0 / 77	0 / 77
68LC060	0.42	MS11	KLM	RC	9847	0 / 200	0 / 200	0 / 50	0 / 50
68LC060	0.42	MS11	KLM	RC	9844	0 / 200	9 / 200	0 / 191	- / -
68LC060	0.42	MS11	KLM	ZU	9806	0 / 77	1 / 77	0 / 76	0 / 76
68332	0.65	TSC8	ATX	FC	9802	0 / 80	0 / 80	0 / 80	0 / 80
68340	0.65	TSC8	KLM	FE	9803	0 / 87	0 / 87	0 / 87	- / -
68341	0.8	MOS8	KLM	FT	9815	0 / 24	0 / 24	0 / 24	0 / 24
68360	0.55	MS11	KLM	RC	9750	0 / 77	0 / 77	0 / 75	0 / 74
68882	1.0	MOS8	KLM	FN	9815	0 / 32	0 / 32	0 / 32	0 / 32
68882	1.0	MOS8	KLM	FN	9818	0 / 32	0 / 32	0 / 32	0 / 32
68882	1.0	MOS8	KLM	FN	9820	0 / 32	0 / 32	0 / 32	0 / 32
68882	1.0	MOS8	KLM	FN	9828	0 / 32	0 / 32	0 / 32	0 / 32
68882	1.0	MOS8	KLM	FN	9835	0 / 32	0 / 32	0 / 32	0 / 32
68882	1.0	MOS8	KLM	FN	9833	0 / 32	0 / 32	0 / 32	0 / 32
68882	1.0	MOS8	KLM	FN	9835	0 / 32	0 / 32	0 / 32	0 / 32
68882	1.0	MOS8	KLM	FN	9833	0 / 32	0 / 32	0 / 32	0 / 32
68882	1.0	MOS8	KLM	FN	9839	0 / 32	0 / 32	0 / 32	0 / 32
68882	1.0	MOS8	KLM	FN	9845	0 / 32	0 / 32	0 / 32	0 / 32
68882	1.0	MOS8	KLM	FN	9850	0 / 32	0 / 32	0 / 32	0 / 32
68882	1.0	MOS8	KLM	FN	9803	0 / 32	0 / 32	0 / 32	0 / 32
823/850	0.34	MS11	KLM	ZT	9824	0 / 77	0 / 77	0 / 77	0 / 76
823/850	0.34	MS11	KLM	ZT	9824	0 / 77	0 / 77	0 / 77	0 / 77
823/850	0.34	MS11	KLM	ZT	9824	0 / 77	0 / 77	0 / 77	0 / 77
823/850	0.34	MS11	KLM	ZT	9824	0 / 77	0 / 77	0 / 77	0 / 77
823/850	0.34	MS11	KLM	ZT	9824	0 / 77	0 / 77	0 / 77	0 / 77



Temperature/Humidity Bias Data

DEVICE	LEFF	FAB	ASSY	PKG	DATE	READ POINTS: FAILS/SS				
						PRECOND	0 HRS	168 HRS	504 HRS	1008 HRS
414355	0.42	MS11	ASTRA	FT	N/A	LEVEL-3	0 / 77	0 / 70	0 / 70	0 / 70
414355	0.42	MS11	ASTRA	FT	N/A	LEVEL-3	0 / 71	0 / 71	0 / 70	0 / 68
414355	0.42	MS11	ASTRA	FT	N/A	LEVEL-3	0 / 72	0 / 72	0 / 70	0 / 69
56009	0.55	TSC8	P1	FJ	9810	LEVEL-1	0 / 77	0 / 77	0 / 77	0 / 77
56009	0.55	TSC8	P1	FJ	9811	LEVEL-1	0 / 77	0 / 77	0 / 77	0 / 77
56009	0.55	TSC8	P1	FJ	9814	LEVEL-1	0 / 77	0 / 77	0 / 77	0 / 77
56303	0.42	MS11	METL	GC	9752	LEVEL-5	0 / 77	0 / 77	- / -	- / -
56303	0.42	MS11	METL	GC	9801	LEVEL-5	0 / 75	0 / 75	- / -	- / -
68341	0.8	MOS8	KLM	FT	9845	LEVEL-1	0 / 45	0 / 45	0 / 45	- / -
860	0.42	MS11	KLM	ZP	9748	LEVEL-3	0 / 77	0 / 77	0 / 77	0 / 76
860	0.42	MS11	KLM	ZP	9750	LEVEL-3	0 / 76	0 / 76	0 / 76	0 / 76



Temp. Cycling Data (-65°C/+150°C)

DEVICE	LEFF	FAB	ASSY	PKG	DATE	READ POINTS: FAILS/SS				
						PRECOND	0 CY	100 CY	500 CY	1000 CY
414256	0.65	MS10	KLM	FN	9832	LEVEL-3	0 / 30	0 / 30	0 / 30	- / -
414294	0.65	MOS8	ANAM	FT	9804	LEVEL-3	0 / 79	0 / 79	0 / 79	0 / 79
414294	0.65	MOS8	ANAM	FT	9802	LEVEL-3	0 / 38	0 / 38	0 / 38	0 / 38
414355	0.42	MS11	ASTRA	FT	N/A	LEVEL-3	0 / 77	0 / 77	- / -	- / -
414355	0.42	MS11	ASTRA	FT	N/A	LEVEL-3	0 / 77	0 / 77	0 / 77	- / -
414355	0.42	MS11	ASTRA	FT	N/A	LEVEL-3	0 / 77	0 / 77	0 / 77	0 / 77
414361	0.65	MS11	ANAM	EM	9807	LEVEL-4	0 / 75	0 / 75	- / -	- / -
414361	0.65	MS11	ANAM	EM	9807	LEVEL-4	0 / 75	0 / 74	- / -	- / -
414361	0.42	MS11	ANAM	EM	9807	LEVEL-4	0 / 75	0 / 74	- / -	- / -
5206	0.65	MOS8	SKO	FT	9748	LEVEL-4	0 / 77	0 / 77	0 / 77	0 / 77
5206	0.65	MOS8	SKO	FT	9748	LEVEL-4	0 / 77	0 / 77	0 / 77	0 / 77
5206	0.65	MOS8	SKO	FT	9748	LEVEL-4	0 / 77	0 / 77	0 / 77	0 / 77
5206	0.65	MOS8	KLM	FT	9828	LEVEL-1	0 / 45	0 / 45	0 / 45	- / -
5206	0.65	MOS8	KLM	FT	9833	LEVEL-3	0 / 45	0 / 45	0 / 45	- / -
5206	0.65	MOS8	KLM	FT	9837	LEVEL-1	0 / 45	0 / 45	0 / 0	- / -
5206	0.65	MOS8	KLM	FT	98Q4	LEVEL-1	0 / 45	0 / 45	0 / 45	- / -
5206	0.65	MOS8	KLM	FT	9845	LEVEL-1	0 / 45	0 / 45	0 / 45	- / -
5206	0.55	TSC8	KLM	FC	9846	LEVEL-4	0 / 94	0 / 94	- / -	- / -
5206	0.55	TSC8	KLM	FC	9846	LEVEL-4	0 / 78	0 / 78	- / -	- / -
5206	0.55	TSC8	KLM	FC	9846	LEVEL-4	0 / 75	0 / 75	- / -	- / -
5307	0.34	MS13	SKO	FT	9809	LEVEL-4	0 / 77	0 / 77	0 / 77	0 / 77
5307	0.34	MS13	SKO	FT	9809	LEVEL-4	0 / 77	0 / 77	0 / 77	0 / 77
5307	0.34	MS13	SKO	FT	9809	LEVEL-4	0 / 77	0 / 77	0 / 77	0 / 77
56303	0.34	MS13	KLM	PV	9819	LEVEL-3	0 / 77	0 / 77	0 / 77	- / -
56303	0.34	MS13	KLM	PV	9821	LEVEL-3	0 / 77	0 / 77	0 / 77	0 / 77
56303	0.34	MS13	KLM	PV	9822	LEVEL-3	0 / 77	0 / 77	0 / 77	0 / 77
56303	0.34	MS13	METL	GC	9818	LEVEL-4	0 / 77	0 / 77	0 / 77	0 / 77
56303	0.34	MS13	METL	GC	9821	LEVEL-4	0 / 77	0 / 77	0 / 76	0 / 74
56303	0.34	MS13	METL	GC	9822	LEVEL-4	0 / 77	0 / 77	0 / 77	0 / 77
56362	0.34	MS13	SHC	PV	9802	LEVEL-3	0 / 77	0 / 77	- / -	- / -
56362	0.34	MS13	SHC	PV	9746	LEVEL-3	0 / 77	0 / 74	- / -	- / -
56362	0.34	MS13	SHC	PV	9803	LEVEL-3	0 / 77	0 / 76	- / -	- / -
68EC000	0.80		SHC	FU		LEVEL-1	0 / 47	0 / 47	0 / 47	0 / 47
68EC000	0.80		SHC	FU		LEVEL-1	0 / 47	0 / 47	0 / 47	0 / 47
68EC000	0.8	MS10	KLM	FN	9814	LEVEL-3	0 / 30	0 / 30	0 / 30	- / -
68EC000	0.65	MS10	KLM	FN	9840	LEVEL-3	0 / 30	0 / 30	0 / 30	- / -
68EC000	0.65	MS10	KLM	FN	9845	LEVEL-3	0 / 30	0 / 30	0 / 30	- / -
68EC000	0.65	MS10	KLM	FN	9828	LEVEL-3	0 / 30	0 / 30	0 / 30	- / -



Temp. Cycling Data (continued)

DEVICE	LEFF	FAB	ASSY	PKG	DATE	READ POINTS: FAILS/SS				
						PRECOND	0 CY	100 CY	500 CY	1000 CY
68HC000	0.8	MS10	ASTRA	FN	9808	LEVEL-3	0 / 30	0 / 30	0 / 30	- / -
68HC000	0.8	MS10	ASTRA	FN	9803	LEVEL-3	0 / 30	0 / 30	0 / 30	- / -
68HC000	0.8	MS10	KLM	FN	9822	LEVEL-3	0 / 30	0 / 30	0 / 30	- / -
68HC000	0.8	MOS8	KLM	FN	9848	LEVEL-3	0 / 30	0 / 30	0 / 30	- / -
68HC000	0.8	TSC	KLM	FN	9833	LEVEL-3	0 / 77	0 / 77	0 / 77	0 / 77
68HC000	0.8	TSC	KLM	FN	9833	LEVEL-3	0 / 77	0 / 77	0 / 77	0 / 77
68HC000	0.8	TSC	KLM	FN	9833	LEVEL-3	0 / 77	0 / 77	0 / 77	0 / 77
68HC000	0.8	MOS8	KLM	RC	9845	N/A	0 / 30	0 / 30	0 / 30	- / -
68HC000	0.8	MS10	KLM	FN	9836	LEVEL-3	0 / 30	0 / 30	0 / 30	- / -
68HC001	0.8	MS10	KLM	FN	9818	LEVEL-3	0 / 30	0 / 30	0 / 30	- / -
68SEC000	0.65	TSC8	KLM	FU	9836	LEVEL-1	0 / 77	0 / 77	0 / 77	0 / 77
68SEC000	0.65	TSC8	KLM	FU	9836	LEVEL-1	0 / 77	0 / 77	0 / 77	0 / 77
68SEC000	0.65	TSC8	KLM	FU	9837	LEVEL-1	0 / 77	0 / 77	0 / 77	0 / 77
68SEC000	0.65	MS10	KLM	FN	9813	LEVEL-3	0 / 30	0 / 30	- / -	- / -
68SEC000	0.65	TSC8	KLM	FN	9835	LEVEL-3	0 / 77	0 / 77	0 / 77	0 / 77
68SEC000	0.65	TSC8	KLM	FN	9835	LEVEL-3	0 / 77	0 / 77	0 / 77	0 / 77
68SEC000	0.65	TSC8	KLM	FN	9835	LEVEL-3	0 / 77	0 / 77	0 / 77	0 / 77
68020	1	TSC	KLM	FC	9804	LEVEL-4	0 / 30	0 / 30	0 / 30	- / -
68020	1	TSC	KLM	FC	9832	N/A	0 / 30	0 / 30	0 / 30	- / -
68020	1	TSC	KLM	FE	9802	N/A	0 / 30	0 / 30	0 / 30	- / -
68020	1	TSC	KLM	FE	9818	N/A	0 / 30	0 / 30	0 / 30	- / -
68020	1	TSC	KLM	RC	9801	N/A	0 / 30	0 / 30	0 / 30	- / -
68020	1	TSC	KLM	RC	9828	N/A	0 / 30	0 / 30	0 / 30	- / -
68020	1	TSC	KLM	RC	9848	N/A	0 / 30	0 / 30	0 / 30	- / -
68030	0.8	MOS8	KLM	RP	9839	N/A	0 / 45	0 / 45	0 / 45	- / -
68030	0.8	MOS8	KLM	RP	9843	N/A	0 / 45	0 / 45	0 / 45	- / -
68EC030	0.8	MOS8	KLM	FE	9810	N/A	0 / 30	0 / 30	0 / 30	- / -
68EC030	0.8	MOS8	KLM	FE	9813	N/A	0 / 30	0 / 30	- / -	- / -
68EC030	0.8	MOS8	KLM	FE	9817	N/A	0 / 30	0 / 30	0 / 30	- / -
68EC030	0.8	MOS8	KLM	FE	9827	N/A	0 / 30	0 / 30	0 / 30	- / -
68EC030	0.8	MOS8	KLM	FE	9835	N/A	0 / 30	0 / 30	0 / 30	- / -
68EC030	1	TSC	KLM	FE	9841	N/A	0 / 30	0 / 30	0 / 30	- / -
68EC030	1	TSC	KLM	FE	9845	N/A	0 / 30	0 / 30	0 / 30	- / -
68EC040	0.65	MS11	KLM	RC	9816	N/A	0 / 30	0 / 30	0 / 30	- / -
68EC040	0.65	MS11	KLM	RC	9816	N/A	0 / 30	0 / 30	0 / 30	- / -
68EC040	0.65	MS11	KLM	RC	9820	N/A	0 / 30	0 / 30	0 / 30	- / -
68EC040	0.65	MS11	KLM	RC	9838	N/A	0 / 30	0 / 30	0 / 30	- / -
68EC040	0.65	MS11	KLM	RC	9828	N/A	0 / 30	0 / 30	0 / 30	- / -
68LC040	0.65	MS11	KLM	FE	9814	N/A	0 / 30	0 / 30	0 / 30	- / -
68LC040	0.65	MS11	KLM	RC	9808	N/A	0 / 30	0 / 30	0 / 30	- / -
68LC040	0.65	MS11	KLM	RC	9810	N/A	0 / 30	0 / 30	0 / 30	- / -
68LC040	0.65	MS11	KLM	RC	9836	N/A	0 / 30	0 / 30	0 / 30	- / -



Temp. Cycling Data (continued)

DEVICE	LEFF	FAB	ASSY	PKG	DATE	READ POINTS: FAILS/SS				
						PRECOND	0 CY	100 CY	500 CY	1000 CY
68LC302		MS11	SHC	PV		LEVEL-4	0 / 47	0 / 47	- / -	- / -
68306	0.65	MOS8	KLM	FC	9813	LEVEL-4	0 / 30	0 / 30	0 / 30	- / -
68306	0.65	MOS8	KLM	FC	9850	LEVEL-3	0 / 30	0 / 30	0 / 30	- / -
68328	0.65		SHC	PV		LEVEL-1	0 / 47	0 / 47	0 / 47	0 / 47
68340	0.65	TSC8	KLM	FE	9831	N/A	0 / 30	0 / 30	0 / 30	- / -
68340	0.65	TSC8	KLM	FE	9841	N/A	0 / 30	0 / 30	0 / 30	- / -
68341	0.8	MOS8	KLM	FT	9804	LEVEL-4	0 / 45	0 / 45	0 / 45	- / -
68349	0.8	MOS8	KLM	FT	9801	LEVEL-3	0 / 77	0 / 77	0 / 77	- / -
68349	0.8	MOS8	KLM	FT	9801	LEVEL-3	0 / 87	0 / 87	- / -	- / -
860	0.42	MS11	KLM	ZP	9748	LEVEL-3	0 / 77	0 / 77	0 / 77	1 / 77
860	0.42	MS11	KLM	ZP	9750	LEVEL-3	0 / 77	0 / 77	0 / 77	0 / 77



Autoclave Data

DEVICE	LEFF	FAB	ASSY	PKG	DATE	READ POINTS: FAILS/SS			
						PRECOND	0 HRS	48 HRS	144 HRS
414256	0.65	MS10	KLM	FN	9832	LEVEL-3	0 / 30	0 / 30	0 / 30
414294	0.65	MOS8	ANAM	FT	9802	LEVEL-3	0 / 77	2 / 77	0 / 74
414294	0.65	MOS8	ANAM	FT	9804	LEVEL-3	0 / 77	0 / 77	0 / 77
414355	0.42	MS11	ASTRA	FT	N/A	LEVEL-4	0 / 77	0 / 77	- / -
414355	0.42	MS11	ASTRA	FT	N/A	LEVEL-4	0 / 77	0 / 77	- / -
414355	0.42	MS11	ASTRA	FT	N/A	LEVEL-4	0 / 77	0 / 77	- / -
414361	0.65	MS11	ANAM	EM	9807	LEVEL-4	0 / 125	0 / 125	- / -
414361	0.65	MS11	ANAM	EM	9807	LEVEL-4	0 / 125	0 / 125	0 / 125
414361	0.42	MS11	ANAM	EM	9807	LEVEL-4	0 / 125	0 / 125	- / -
414361	0.42	MS11	ANAM	EM	9807	N/A	0 / 125	0 / 125	0 / 125
5206	0.65	MOS8	KLM	FT	9828	LEVEL-1	0 / 45	0 / 45	0 / 45
5206	0.65	MOS8	KLM	FT	9837	LEVEL-1	0 / 45	0 / 45	0 / 45
5206	0.65	MOS8	KLM	FT	9833	LEVEL-3	0 / 45	0 / 45	0 / 45
5206	0.65	MOS8	KLM	FT	9839	LEVEL-1	0 / 45	0 / 45	0 / 45
5206	0.65	MOS8	KLM	FT	9838	LEVEL-1	0 / 45	0 / 45	0 / 45
5206	0.55	TSC8	KLM	FC	9846	LEVEL-4	0 / 93	0 / 93	0 / 93
5206	0.55	TSC8	KLM	FC	9846	LEVEL-4	0 / 62	0 / 62	0 / 62
5206	0.55	TSC8	KLM	FC	9846	LEVEL-4	0 / 77	0 / 77	- / -
5307	0.34	MS13	SKO	FT	9809	LEVEL-4	0 / 77	0 / 77	0 / 77
5307	0.34	MS13	SKO	FT	9809	LEVEL-4	0 / 77	0 / 77	0 / 77
5307	0.34	MS13	SKO	FT	9809	LEVEL-4	0 / 77	0 / 77	0 / 77
56009	0.65	MS12	SHC	FJ	9807	N/A	0 / 84	0 / 84	0 / 84
56303	0.34	MS13	KLM	PV	9819	LEVEL-3	0 / 77	0 / 77	0 / 77
56303	0.34	MS13	KLM	PV	9821	LEVEL-3	0 / 77	0 / 77	0 / 77
56303	0.34	MS13	KLM	PV	9822	LEVEL-3	0 / 77	0 / 77	0 / 77
56303	0.34	MS13	METL	GC	9818	LEVEL-4	0 / 77	0 / 77	0 / 77
56303	0.34	MS13	METL	GC	9821	LEVEL-4	0 / 77	0 / 77	0 / 77
56303	0.34	MS13	METL	GC	9822	LEVEL-4	0 / 77	0 / 77	0 / 77
68EC000	0.8	MS10	KLM	FN	9814	LEVEL-3	0 / 30	0 / 30	0 / 30
68EC000	0.65	MS10	KLM	FN	9828	LEVEL-3	0 / 30	0 / 30	0 / 30
68EC000	0.65	MS10	KLM	FN	9845	LEVEL-3	0 / 30	0 / 30	0 / 30
68EC000	0.65	MS10	KLM	FN	9840	LEVEL-3	0 / 30	0 / 30	0 / 30



Autoclave Data (continued)

DEVICE	LEFF	FAB	ASSY	PKG	DATE	READ POINTS: FAILS/SS			
						PRECOND	0 HRS	48 HRS	144 HRS
68HC000	0.8	MS10	ASTRA	FN	9808	LEVEL-3	0 / 30	0 / 30	0 / 30
68HC000	0.8	MS10	ASTRA	FN	9803	LEVEL-3	0 / 30	0 / 30	0 / 30
68HC000	0.8	MS10	KLM	FN	9822	LEVEL-3	0 / 30	0 / 30	0 / 30
68HC000	0.8	MS10	KLM	FN	9836	LEVEL-3	0 / 30	0 / 30	0 / 30
68HC000	0.8	MOS8	KLM	FN	9848	LEVEL-3	0 / 30	0 / 30	0 / 30
68HC000	0.8	TSC	KLM	FN	9833	LEVEL-3	0 / 77	0 / 77	0 / 77
68HC000	0.8	TSC	KLM	FN	9833	LEVEL-3	0 / 77	0 / 77	0 / 77
68HC000	0.8	TSC	KLM	FN	9833	LEVEL-3	0 / 77	0 / 77	0 / 77
68HC001	0.8	MS10	KLM	FN	9818	LEVEL-3	0 / 30	0 / 30	0 / 30
68SEC000	0.65	TSC8	KLM	FU	9836	LEVEL-1	0 / 76	0 / 76	0 / 76
68SEC000	0.65	TSC8	KLM	FU	9836	LEVEL-1	0 / 76	0 / 76	0 / 76
68SEC000	0.65	TSC8	KLM	FU	9837	LEVEL-1	0 / 77	0 / 77	0 / 77
68SEC000	0.65	MS10	KLM	FN	9813	LEVEL-3	0 / 30	0 / 30	0 / 30
68SEC000	0.65	TSC8	KLM	FN	9835	LEVEL-3	0 / 76	0 / 76	0 / 76
68SEC000	0.65	TSC8	KLM	FN	9835	LEVEL-3	0 / 76	0 / 76	0 / 76
68SEC000	0.65	TSC8	KLM	FN	9835	LEVEL-3	0 / 77	0 / 77	0 / 77
68020	1	TSC	KLM	FC	9804	LEVEL-4	0 / 30	0 / 30	0 / 30
68306	0.65	MOS8	KLM	FC	9813	LEVEL-4	0 / 30	0 / 30	0 / 30
68306	0.65	MOS8	KLM	FC	9850	LEVEL-3	0 / 30	0 / 30	0 / 30
68341	0.8	MOS8	KLM	FT	9804	LEVEL-4	0 / 45	0 / 45	0 / 45
68341	0.8	MOS8	KLM	FT	9815	LEVEL-1	0 / 45	0 / 45	0 / 45
68341	0.8	MOS8	ANAM	FT	9848	LEVEL-1	0 / 45	0 / 45	0 / 45
823/850	0.34	MS11	METL	ZT	9824	LEVEL-3	0 / 77	0 / 77	2 / 77
823/850	0.34	MS11	METL	ZT	9824	LEVEL-3	0 / 77	0 / 77	0 / 77
823/850	0.34	MS11	METL	ZT	9824	LEVEL-3	0 / 77	0 / 76	0 / 76
823/850	0.34	MS11	METL	ZT	9824	LEVEL-3	0 / 77	0 / 77	- / -
823/850	0.34	MS11	METL	ZT	9824	LEVEL-3	0 / 77	0 / 77	- / -
823/850	0.34	MS11	METL	ZT	9824	LEVEL-3	0 / 77	0 / 77	- / -
860	0.42	MS11	KLM	ZP	9748	LEVEL-3	0 / 77	0 / 77	0 / 77
860	0.42	MS11	KLM	ZP	9750	LEVEL-3	0 / 77	0 / 77	0 / 77



Summary of Failures

Reports on all failures, where the mechanism is identified, are sent to the organization responsible for the defect. In addition, the failure mechanism information is added to a computer database which allows signature analysis of failure mode. Mechanism summaries are created and discussed periodically with our manufacturing sites. Continuous improvement plans are required from all manufacturing sites.

125°C HIGH TEMPERATURE OPERATING LIFE (HTOL) TEST

LOTNO.	DEVICE	ASSY	TECH.	FAB	QTY	READ PT/ FAILURE MODE/MECHANISM
Rel200008-01	68HC000	KLM	0.8	MS10	1	168hour/ Functional fail- F/A not completed
RelSB459021	68SEC000	KLM	0.65	MS10	1	168hour/ Short,Sagging wire
Rel200031-01	414362	SHC	0.65	MOS8	1	168 hour/ Bin 2 functional failure - unable to do F/A
Rel200044-01	5204	SHC	0.34	MS13	1	504 hour/ IDDQ failure- F/A not completed
Rel 134911-1	5204	SHC	0.34	MS13	1	504 hour/ Scan failure confirmed in F/A as intermittent
Rel136207-1	56303	KLM	0.42	MS11	1	168 hour/ functional fail-recovered during liquid crystal
Rel136207-1	56303	KLM	0.42	MS11	1	1008 hour/ Stop IDD @68Vt; unable to determine cause
Rel200027-03	68LC060	KLM	0.42	MS11	1	168 hour/ Leakage - sample in F/A
Rel200043-1	56009	P1	0.55	TSC8	1	168 hour/ICC stop - F/A revealed no anomalies
KBE855864	68EC060	KLM	0.42	MS11	3	168 hour/ functional failures due to gate oxide failure
KBE863773	68LC060	KLM	0.42	MS11	9	168 hour/ functional failures due to gate oxide failure

TEMPERATURE CYCLING (T/C) TEST

LOTNO.	DEVICE	CLASS	ASSY	TECH.	FAB	QTY	PKG	READ PT/ FAILURE MODE/MECHANISM
Rel134041-2	860	III	KLM	0.5	MS11	1	ZP	1000 CYC/ Unknown

AUTOCLAVE (A/C) TEST

LOTNO.	DEVICE	CLASS	ASSY	TECH.	FAB	QTY	PKG	READ PT/ FAILURE MODE/MECHANISM
Rel200030-4	414294	III	ANAM	0.65	MOS8	2	FT	48 HRS/ Unknown
Rel200095-2	823/850	III	METL	0.34	MS11	2	ZT	144 HRS/ 1 fails high freq clock, other lo freq EZ