Comm/Ind Tier Qual Results

Objective:	**MKE02Z64(MA64) 64QFP14x14 TSMC10 Qualification**				
Freescale PN: Part Name:	MKE02Z64VQH2 "MA64"	Customer Name(s): PN(s):	"Varies" "Varies"	Plan or Results: Revision # & Date:	Rev A - Report See revision history
Technology: Package:	E018AFX5 / 0.18um SGF 6057 / QFP 64 14*14*2.2P0.8	Design Engr:	Lu David-R58892	QUARTZ Tracking #:	223690/224763
Fab / Assembly / Final Test Sites:	TSMC10 / FSL-KLM-FM/ FSL-TJN-FM	Product Engr:	Wang Bin-R63987		(Signature/Date shown below may be electronic)
Maskset#: Rev#:	0N22J&2N22J	GAO(Global Assembly Aperation) Engr:	Mei P.L-R60516	GAO Approval (for DIM/BOM results) Signature & Date:	Mei P.L-R60516 Nov-29-2013
Die Size (in mm) W x L	2.552X2.305	NPI PRQE:	Long Nancy-B07252	NPI PRQE Approval Signature & Date:	Long Nancy-B07252 Nov-28-2013
Part Operating Temp. Grade:	Grade 2 -40 °C to +105 °C	Trace/DateCode:	LOT A-0N22J 8EMHA1YW0G00 LOT B-0N22J 8EMHA1YW0P00 LOT C-0N22J 8EMHA1YW0Y00 LOT D-2N22J 8EMAH21APD00	CAB Approval Signature & Date:	13150880M Dec-12-2013
				Customer Approval Signature & Date:	NA

TESTS HIGHLIGHTED IN YELLOW WILL BE PERFORMED FOR THIS STUDY

This testing is performed by Freescale Reliability Lab (FSL-TJN) unless otherwise noted in the Comments.

GROUP A - ACCELERATED ENVIRONMENTAL STRESS TESTS

Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments or Generic Data
PC	JESD22- A113 J-STD-020	**Preconditioning (PC) :** PC required for SMDs only. MSL 3 @ 260°C, +5/-0°C	TEST @ RH	All surface mount devices prior to THB, HAST, AC, UHST, TC, PC+PTC and as required per test conditions.			LotA: 0/50	Generic data: Q221905, PT60(0N53H) 64QFP: 0/150
HAST	JESD22- A101 A110	**Highly Accelerated Stress Test (HAST):** PC before HAST (for SMDs only): Required HAST = 110°C/85% for 264hrs Bias = 5.5V *Timed RO of 48hrs. MAX*	TEST @ RH	25	1	25	LotA: 0/25	Generic data: Q221905, PT60(0N53H) 64QFP: 0/75
UHST	JESD22- A102 A118	**Unbiased HAST (UHST):** PC before UHST (for SMDs only): Required UHST = 110°C/85%RH for 264hrs *Timed RO of 48hrs. MAX*	TEST @ R	0	0	0		
TC	JESD22- A104 AEC Q100- Appendix 3	**Temperature Cycle (TC):** PC before TC (for SMDs only): Required TC = -65°C to 150°C for 500 cycles	TEST @ H	25	1	25	LotA: 0/25	Generic data: Q221905, PT60(0N53H) 64QFP: 0/75
HTSL	JESD22- A103	**High Temperature Storage Life (HTSL):** 175°C for 504hrs *Timed RO = 96hrs. MAX*	TEST @ RH	77	1	77	LotA: 0/77	

TEST GROUP B - ACCELERATED LIFETIME SIMULATION TESTS

Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments or Generic Data
HTOL	JESD22- A108	**High Temperature Operating Life (HTOL):** Ta = 125°C for 264 hrs Bias: Core=2.2V, IO=6V Dflash WE 50k + Pflash WE 10k @ 125°C @ Vdd = 5V Devices incorporating NVM shall receive 1X 'NVM endurance preconditioning'(W/E cycling). Test R, H, C after W/E cycling. *Timed RO of 96hrs. MAX*	TEST @ RHC	77	3	231	LotA: 0/77 LotB: 0/77 LotC: 0/77	
HTOL	JESD22- A108	**High Temperature Operating Life (HTOL):** Ta = 125°C for 27 hrs Bias: Core=2.2V, IO=6V Dflash WE 50k + Pflash WE 10k @ 125°C @ Vdd = 5V Devices incorporating NVM shall receive 1X 'NVM endurance preconditioning'(W/E cycling). Test R, H, C after W/E cycling. *Timed RO of 96hrs. MAX*	TEST @ RHC	77	1	77	Lot D: 0/77	
ELFR	AEC Q100-008	**Early Life Failure Rate (ELFR):** AEC Ta = 125°C for 48 hrs Bias: Core=2.2V, IO=6V *Timed RO of 48 hrs MAX*	TEST @ RH	611	3	1833	LotA: 0/611 LotB: 0/611 LotC: 0/611	
EDR	AEC Q100-005	**NVM Endurance, Data Retention, and Operational Life (EDR):** Dflash WE 50k + Pflash(64k) WE 10k @ 125°C DRB 150°C for 264Hrs Devices incorporating NVM shall receive 1X 'NVM endurance preconditioning'(W/E cycling). Test R, H, C after W/E cycling. *Timed RO of 96hrs. MAX*	TEST @ RHC	77	3	231	LotA: 0/77 LotB: 0/77 LotC: 0/77	

TEST GROUP C - PACKAGE ASSEMBLY INTEGRITY TESTS

Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments or Generic Data
WBS	AEC Q100-001	**Wire Bond shear (WBS)**	Cpk = or > 1.67	30 bonds from minimum 5 units	3	15	Lot A: 0/5, Cpk>1.67 Lot B: 0/5, Cpk>1.67 Lot C: 0/5, Cpk>1.67	
WBP	MilStd883- 2011	**Wire Bond Pull (WBP):** Cond. C or D	Cpk = or > 1.67	30 bonds from minimum 5 units	3	15	Lot A: 0/5, Cpk>1.67 Lot B: 0/5, Cpk>1.67 Lot C: 0/5, Cpk>1.67	
SD	JESD22- B102	**Solderability (SD):** 8hr.(1 hr. for Au-plated leads) Steam age prior to test. If production burn-in is done, samples must also undergo burn-in prior to SD.	>95% lead coverage of critical areas	15	0	0	pass	MA64 QFP64 assembly CZ: pass
PD	JESD22- B100	**Physical Dimensions(PD):** PD per FSL 98A drawing	Cpk = or > 1.67	10	0	0	pass	MA64 QFP64 assembly CZ: 0/30x3lots, Cpk>1.67
DIM & BOM		**Dimensional (DIM):** GAO to verify PD results against valid 98A drawing. **BOM Verification (BOM):** GAO to verify qual lot ERF BOM is accurate.					DIM: approved BOM: passed	
SBS	AEC-Q100-010	**Solder Ball Shear (SBS):** Performed on all solder ball mounted packages e.g. PBGA, Chip Scale, Micro Lead Frame (but NOT Flip Chip). Two reflow cycles at MSL reflow temperature before shear.	Cpk = or >1.67	10 (5 balls from a min. of 10 devices)	0	0	not required	For solder ball mounted packages only; NOT for Flip Chips.
LI	JESD22- B105	**Lead Integrity (LI):** Not required for surface mount devices; Only required for through-hole devices.	No lead breakage or cracks	5 (10 leads from each of 5 parts)	0	0	not required	

TEST GROUP E - ELECTRICAL VERIFICATION TESTS

Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments or Generic Data
TEST	Freescale 48A	**Pre- and Post Functional / Parametrics (TEST):** For AEC, test software shall meet requirements of AEC-Q100-007. Testing performed to the limits of device specification in temperature and limit value.	0 Fails	All	All	All	passed	This action refers to Final Testing of all qualification units.
HBM	AEC-Q100-002 / JESD22-A114E Jan 2007	**ElectroStatic Discharge/** **Human Body Model Classification (HBM):** 500/1000/1500/2000/2500/3000/4000/5000/6000 Volts For AEC, see AEC-Q100-002 for classification levels.	TEST @ RH 2KV min.	3 units per Voltage level	1	27	LotD: 0/3@500V 0/3@1000V 0/3@1500V 0/3@2000V 0/3@2500V 0/3@3000V 0/3@4000V 0/3@5000V 0/3@6000V	
CDM	AEC-Q100-011	**ElectroStatic Discharge/** **Charged Device Model Classification (CDM):** Test @ 250/500/750 Volts For AEC, see AEC-Q100-011 for classification levels. ***Timed RO of 96hrs MAX.***	TEST @ RH All pins =/> 500V Corner pins =/> 750V;	3 units per Voltage level	1	9	Lot D: 0/3@250V 0/3@500V 0/3@750V(CP)	
LU	JESD78 plus AEC-Q100- 004 for AEC	**Latch-up (LU):** Test per JEDEC JESD78 with the AEC-Q100-004 requirements for AEC. Ta= Maximum operating temperature Vsupply = Maximum operating voltage	TEST @ RH	6	1	6	Lot D: 0/6	
ED	AEC-Q100-009, Freescale 48A spec	**Electrical Distribution (ED)**	TEST @ RHC	5	3	15	LotA: 0/5 LotB: 0/5 LotC: 0/5	
ED	AEC-Q100-009, Freescale 48A spec	**Electrical Distribution (ED)**	TEST @ RHC	5	1	5	Lot D: 0/5	
FG	For AEC, AEC-Q100-007	**Fault Grading (FG)**	FG shall be = or > 90% for qual units				FG%>98%	
CHAR	For AEC, AEC-Q003	**Characterization (CHAR):** Ony performed on new technologies and part families per AEC Q003.						
EMC	IEC 61967-2 - Radiated Emission Measurement (TEM Cell)	**Electromagnetic Compatibility (EMC)** Test per IEC 61967-2. Ta= Room Temp Vsupply = Typical operating voltage					report available upon request	Done on MA64 TSMC11 QFP64 package

MA64 QFP 64 14*14*2.2P0.8/6057 BOM:

Quartz#	Fab/Mask Set/Tech	Product-Qual Description/Part Number (s)	Die Area (mmxmm)	Assembly Site	Pkg Description/Code	Mold Description	EPOXY Description	Wire Description
223690	TSMC10/N22J/E018AFX5-0.18SGF	MKE02Z64(MA64)	2.552x2.305	FSL-KLM-FM	QFP 64 14*14*2.2P0.8/6057	CEL-9200HF10M CU WIRE	SUMITOMO CRM-1064MBL	25UM CU WIRE

Package Qual Generic data

Quartz#	Fab/Mask Set/Tech/polyimide	Product-Qual Description/Part Number (s)	Die Area (mmxmm)	Assembly Site	Pkg Description/Code	Mold Description	EPOXY Description	Wire Description	CAB
221905	TSMC11/0N53H/E018AFX5-0.18SGF	9S08PT60	2.454X2.307	FSL-KLM-FM	QFP 64 14*14*2.2P0.8/6057	CEL-9200HF10M CU WIRE	SUMITOMO CRM-1064MBL	25UM CU WIRE	12522987M

Revision	Date	Comments	Author
Rev. A	Nov-28-2013	Add Qual result	Nancy Long

freescale semiconductor

Technology: E018AFX5 / 0.18um SGF Package: 6057 / QFP 64 14*14*2.2P0.8	Design Engr: Lu David-R58892	QUARTZ Tracking #: 223690/224763

Comm/Ind Tier Qual Results

Objective:	**MKE02Z64(MA64) 64&44LQFP10x10 TSMC10 Qualification**		
Freescale PN: MA64 Part Name: "MA64"	Customer Name(s): "Varies" PN(s): "Varies"	Plan or Results: Rev A - Result Revision # & Date: See revision history	
Technology: E018AFX5 / 0.18um SGF Package: LQFP 64 10*10*1.4P0.5/8426&LQFP 44 10*10*1.4P0.8/8256	Design Engr: Lu David-R58892	QUARTZ Tracking #: 224766	
Fab / Assembly / Final Test Sites: TSMC10/ FSL-TJN-FM / FSL-TJN-FM	Product Engr: Wang Bin-R63987		(Signature/Date shown below may be electronic)
Maskset#: Rev#: 2N22J	GAO(Global Assembly Operation) Engr: Mei P.L-R60516	GAO Approval (for DIM/BOM results) Signature & Date:	Mei P.L-R60516 Jan-28-2014
Die Size (in mm) W x L x T: 2.552X2.305	NPI PRQE: Long Nancy-B07252	NPI PRQE Approval Signature & Date:	Long Nancy-B07252 Jan-28-2014
Part Operating Temp. Grade: Grade 2 / -40 ℃ to +105 ℃	Trace/DateCode: LOT A 8EME0087MU00 - 64LQFP10x10	CAB Approval Signature & Date:	13492989M Jan-29-2014
		Customer Approval Signature & Date:	N/A

TESTS HIGHLIGHTED IN YELLOW WILL BE PERFORMED FOR THIS STUDY

This testing is performed by Freescale Reliability Lab (FSL-TJN) unless otherwise noted in the Comments.

GROUP A - ACCELERATED ENVIRONMENTAL STRESS TESTS

Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments or Generic Data
PC	JESD22-A113 J-STD-020	**Preconditioning (PC) :** PC required for SMDs only. MSL 3 @ 260℃, +5/-0℃	TEST @ RH	All surface mount devices prior to THB, HAST, AC, UHST, TC, PC+PTC and as required per test conditions.			LotA: 0/50	Generic data: Q221902, PT60 LQFP64 10x10(N53H, TSMC11): 0/693
HAST	JESD22-A101 A110	**Highly Accelerated Stress Test (HAST):** PC before HAST (for SMDs only): Required HAST = 110℃/85%RH for 264 hrs Bias = Max Vdd *Timed RO of 48hrs. MAX*	TEST @ RH	25	1	25	LotA: 0/25	Generic data: Q221902, PT60 LQFP64 10x10(N53H, TSMC11): 0/231
UHST	JESD22-A102 A118	**Unbiased HAST (UHST):** PC before UHST (for SMDs only): Required UHST = 110℃/85%RH for 264hrs *Timed RO of 48hrs. MAX*	TEST @ R	0	0	0	not required	
TC	JESD22-A104 AEC Q100-Appendix 3	**Temperature Cycle (TC):** PC before TC (for SMDs only): Required TC = -65℃ to 150℃ for 500 cycles.	TEST @ H	25	1	25	LotA: 0/25	Generic data: Q221902, PT60 LQFP64 10x10(N53H, TSMC11): 0/231 Q218212, PT16 LQFP4410x10(N35F, TSMC11): 0/77
HTSL	JESD22-A103	**High Temperature Storage Life (HTSL):** 175℃ for 504hrs *Timed RO = 96hrs. MAX*	TEST @ RH	77	1	77	LotA: 0/77	

TEST GROUP B - ACCELERATED LIFETIME SIMULATION TESTS

Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments or Generic Data
HTOL	JESD22-A108	**High Temperature Operating Life (HTOL):** Ta = 125℃ for 264 hrs Bias: Core=2.2V, IO=6V Dflash WE 50k + Pflash WE 10k @ 125°C @ Vdd = 5V Devices incorporating NVM shall receive 1X 'NVM endurance preconditioning'(W/E cycling). Test R, H, C after W/E cycling. *Timed RO of 96hrs. MAX*	TEST @ RHC	77	0	0	pass	Q223690, MA64(0N22J, TSMC10) 64QFP Qual: 0/231@125C for 264Hrs Q224763, MA64(2N22J, TSMC10) 64QFP Qual: 0/77@125C for 27Hrs
ELFR	AEC Q100-008	**Early Life Failure Rate (ELFR):** AEC Ta = 125℃ for 48 hrs Bias: Core=2.2V, IO=6V *Timed RO of 48 hrs MAX*	TEST @ RH	611	0	0	pass	Q223690, MA64(0N22J, TSMC10) 64QFP Qual: 0/1833
EDR	AEC Q100-005	**NVM Endurance, Data Retention, and Operational Life (EDR):** Dflash WE 50k + Pflash(64k) WE 10k @ 125°C DRB 150℃ for 264Hrs Devices incorporating NVM shall receive 1X 'NVM endurance preconditioning'(W/E cycling). Test R, H, C after W/E cycling. *Timed RO of 96hrs. MAX*	TEST @ RHC	77	0	0	pass	Q223690, MA64(0N22J, TSMC10) 64QFP Qual: 0/231

TEST GROUP C - PACKAGE ASSEMBLY INTEGRITY TESTS

Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments or Generic Data
WBS	AEC Q100-001	**Wire Bond shear (WBS)**	Cpk = or > 1.67	30 bonds from minimum 5 units	1	5	LotA: 0/5, Cpk>1.67	
WBP	MilStd883-2011	**Wire Bond Pull (WBP):** Cond. C or D	Cpk = or > 1.67	30 bonds from minimum 5 units	1	5	LotA: 0/5, Cpk>1.67	
SD	JESD22-B102	**Solderability (SD):** 8hr.(1 hr. for Au-plated leads) Steam age prior to test. If production burn-in is done, samples must also undergo burn-in prior to SD.	>95% lead coverage of critical areas	15	0	0	pass	TJN Assembly generic data
PD	JESD22-B100	**Physical Dimensions(PD):** PD per FSL 98A drawing	Cpk = or > 1.67	30	0	0	pass	TJN Assembly generic data
DIM & BOM		**Dimensional (DIM):** GAO to verify PD results against valid 98A drawing. **BOM Verification (BOM):** GAO to verify qual lot ERF BOM is accurate.					DIM: pass BOM: approved	
SBS	AEC-Q100-010	**Solder Ball Shear (SBS):** Performed on all solder ball mounted packages e.g. PBGA, Chip Scale, Micro Lead Frame (but NOT Flip Chip). Two reflow cycles at MSL reflow temperature before shear.	Cpk = or >1.67	10 (5 balls from a min. of 10 devices)	0	0	not required	For solder ball mounted packages only; NOT for Flip Chips.
LI	JESD22-B105	**Lead Integrity (LI):** Not required for surface mount devices; Only required for through-hole devices.	No lead breakage or cracks	5 (10 leads from each of 5 parts)	0	0	not required	

TEST GROUP E - ELECTRICAL VERIFICATION TESTS

Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments or Generic Data
TEST	Freescale 48A	**Pre- and Post Functional / Parametrics (TEST):** For AEC, test software shall meet requirements of AEC-Q100-007. Testing performed to the limits of device specification in temperature and limit value.	0 Fails	All	All	All	Completed	This action refers to Final Testing of all qualification units.
HBM	AEC-Q100-002 / JESD22-A114E Jan 2007	**ElectroStatic Discharge/ Human Body Model Classification (HBM):** Test @ 500/1000/1500/2000/2500/3000/4000/5000/6000 Volts For AEC, see AEC-Q100-002 for classification levels.	TEST @ RH 2KV min.	3 units per Voltage level	0	0	pass	Q224763, MA64(2N22J, TSMC10) 64QFP Qual: 0/3@500V, 0/3@1000V, 0/3@1500V, 0/3@2000V, 0/3@2500V, 0/3@3000V, 0/3@4000V, 0/3@5000V, 0/3@6000V
CDM	AEC-Q100-011	**ElectroStatic Discharge/ Charged Device Model Classification (CDM):** Test @ 250/500/750(CP)Volts For AEC, see AEC-Q100-011 for classification levels. ***Timed RO of 96hrs MAX.***	TEST @ RH All pins =/> 500V For AEC, Corner pins =/> 750V;	3 units per Voltage level	1	9	Lot A: 0/3@250V 0/3@500V 0/3@750V(CP)	
LU	JESD78 plus AEC-Q100-004 for AEC	**Latch-up (LU):** Test per JEDEC JESD78 with the AEC-Q100-004 requirements for AEC. Ta= Maximum operating temperature Vsupply = Maximum operating voltage	TEST @ RH	6	0	0	pass	Q224763, MA64(2N22J, TSMC10) 64QFP Qual: 0/6
ED	AEC-Q100-009, Freescale 48A spec	**Electrical Distribution (ED)**	TEST @ RHC For AEC, Cpk target > 1.67	5	0	0	pass	Q223690, MA64(0N22J, TSMC10) 64QFP Qual: 0/15 Q224763, MA64(2N22J, TSMC10) 64QFP Qual: 0/5
FG	For AEC, AEC-Q100-007	**Fault Grading (FG)**	FG shall be = or > 90% for qual units				FG%>98%	
EMC	IEC 61967-2 - Radiated Emission Measurement (TEM Cell)	**Electromagnetic Compatibility (EMC)** Test per IEC 61967-2. Ta= Room Temp Vsupply = Typical operating voltage					report available upon request	Done on MA64 TSMC11 QFP64 package

MA64 LQFP 64 10*10*1.4P0.5/8426 & LQFP 44 10*10*1.4P0.8/8256 BOM

Quartz#	Fab/Mask Set/Tech	Product-Qual Description/Part Number (s)	Die Area (mm2)	Assembly Site	Pkg Description/Code	Mold Description	EPOXY Description	Wire Description
224766	TSMC10/N22J/E018AFX5	MKE02Z64(MA64)	2.552x2.305	FSL-TJN-FM	LQFP 64 10*10*1.4P0.5/8426	CEL-9200HF10M CU WIRE	SUMITOMO CRM-1064MBL	25UM CU WIRE
NA	TSMC10/N22J/E018AFX5	MKE02Z64(MA64)	2.552x2.305	FSL-TJN-FM	LQFP 44 10*10*1.4P0.8/8256	CEL-9200HF10M CU WIRE	SUMITOMO CRM-1064MBL	25UM CU WIRE

Package Qual Generic data

Quartz#	Fab/Mask Set/Tech/polyimide	Product-Qual Description/Part Number (s)	Die Area (mm2)	Assembly Site	Pkg Description/Code	Mold Description	EPOXY Description	Wire Description	CAB
221902	TSMC11/0N53H//E018AFX5	9S08PT60	2454X2307	FSL-TJN-FM	LQFP 64 10*10*1.4P0.5/8426	CEL-9200HF10M CU WIRE	SUMITOMO CRM-1064MBL	25UM CU WIRE	12452621M
218212	TSMC11/0N35F/E018AFX5	9S08PT16	2.268*1.838	FSL-TJN-FM	LQFP 44 10*10*1.4P0.8/8256	CEL-9200HF10M CU WIRE	SUMITOMO CRM-1064MBL	25UM CU WIRE	11332557M

Die Qual Generic data

Quartz #	Mask Set	Product-Qual Description / Part Number(s)	Technology	Fab	Die Size(mm2)	CAB Number	CAB Date	Operation Tem
223690/224763	0N22J&2N22J	MKE02Z64(MA64) 64QFP TSMC10 Qual	E018AFX5	TSMC10	2.552X2.305	13150880M	Dec-12-2013	-40~105C

Revision	Date	Comments	Author
Rev. A	Jan-28-2014	update qual result	Nancy Long

Technology: Package:	E018AFX5 / 0.18um SGF 6057 / QFP 64 14*14*2.2P0.8	Design Engr:	Lu David-R58892	QUARTZ Tracking #:	223690/224763

Comm/Ind Tier Qual Results

Objective:	**MKE02Z64(MA64) 32LQFP 7x7 TSMC10 Qualification**				
Freescale PN: Part Name:	MA64 "MA64"	Customer Name(s): PN(s):	"Varies" "Varies"	Plan or Results: Revision # & Date:	Rev A - Result See revision history
Technology: Package:	E018AFX5 / 0.18um SGF LQFP 32 7*7*1.4P0.8/6300	Design Engr:	Lu David-R58892	QUARTZ Tracking #:	224767
Fab / Assembly / Final Test Sites:	TSMC10/ FSL-TJN-FM / FSL-TJN-FM	Product Engr:	Wang Bin-R63987		(Signature/Date shown below may be electronic)
Maskset#: Rev#:	 2N22J	GAO(Global Assembly Operation) Engr:	Mei P.L-R60516	GAO Approval (for DIM/BOM results) Signature & Date:	Mei P.L-R60516 Jan-28-2014
Die Size (in mm) W x L x T	2.552X2.305	NPI PRQE:	Long Nancy-B07252	NPI PRQE Approval Signature & Date:	Long Nancy-B07252 Jan-28-2014
Part Operating Temp. Grade:	Grade 2 / -40 °C to +105 °C	Trace/DateCode:	LOT A 8EME0087MY00	CAB Approval Signature & Date:	13492991M Jan-29-2014
				Customer Approval Signature & Date:	N/A

TESTS HIGHLIGHTED IN YELLOW WILL BE PERFORMED FOR THIS STUDY

This testing is performed by Freescale Reliability Lab (FSL-TJN) unless otherwise noted in the Comments.

GROUP A - ACCELERATED ENVIRONMENTAL STRESS TESTS

Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments or Generic Data
PC	JESD22- A113 J-STD-020	**Preconditioning (PC) :** PC required for SMDs only. MSL 3 @ 260°C, +5/-0°C	TEST @ RH	All surface mount devices prior to THB, HAST, AC, UHST, TC, PC+PTC and as required per test conditions.			LotA: 0/50	Generic data: Q223255, PT60 LQFP48 7x7(N53H, TSMC11): 0/693 Q219179, PT16 LQFP32 (N35F, TSMC11): 0/77
HAST	JESD22- A101 A110	**Highly Accelerated Stress Test (HAST):** PC before HAST (for SMDs only): Required HAST = 110°C/85%RH for 264 hrs Bias = Max Vdd *Timed RO of 48hrs. MAX*	TEST @ RH	25	1	25	LotA: 0/25	Generic data: Q223255, PT60 LQFP48 7x7(N53H, TSMC11): 0/231
TC	JESD22- A104 AEC Q100- Appendix 3	**Temperature Cycle (TC):** PC before TC (for SMDs only): Required TC = -65°C to 150°C for 500 cycles.	TEST @ H	25	1	25	LotA: 0/25	Generic data: Q223255, PT60 LQFP48 7x7(N53H, TSMC11): 0/231 Q219179, PT16 LQFP32 (N35F, TSMC11): 0/77
HTSL	JESD22- A103	**High Temperature Storage Life (HTSL):** 175°C for 504 hrs *Timed RO = 96hrs. MAX*	TEST @ RH	77	1	77	LotA: 0/77	

TEST GROUP B - ACCELERATED LIFETIME SIMULATION TESTS

Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments or Generic Data
HTOL	JESD22- A108	**High Temperature Operating Life (HTOL):** Ta = 125°C for 264 hrs Bias: Core=2.2V, IO=6V Dflash WE 50k + Pflash WE 10k @ 125°C @ Vdd = 5V Devices incorporating NVM shall receive 1X 'NVM endurance preconditioning'(W/E cycling). Test R, H, C after W/E cycling. *Timed RO of 96hrs. MAX*	TEST @ RHC	77	0	0	pass	Q223690, MA64(0N22J, TSMC10) 64QFP Qual: 0/231@125C for 264Hrs Q224763, MA64(2N22J, TSMC10) 64QFP Qual: 0/77@125C for 27Hrs
ELFR	AEC Q100-008	**Early Life Failure Rate (ELFR):** AEC Ta = 125°C for 48 hrs Bias: Core=2.2V, IO=6V *Timed RO of 48 hrs MAX*	TEST @ RH	611	0	0	pass	Q223690, MA64(0N22J, TSMC10) 64QFP Qual: 0/1833
EDR	AEC Q100-005	**NVM Endurance, Data Retention, and Operational Life (EDR):** Dflash WE 50k + Pflash(64k) WE 10k @ 125°C DRB 150°C for 264Hrs Devices incorporating NVM shall receive 1X 'NVM endurance preconditioning'(W/E cycling). Test R, H, C after W/E cycling. *Timed RO of 96hrs. MAX*	TEST @ RHC	77	0	0	pass	Q223690, MA64(0N22J, TSMC10) 64QFP Qual: 0/231

TEST GROUP C - PACKAGE ASSEMBLY INTEGRITY TESTS

Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments or Generic Data
WBS	AEC Q100-001	**Wire Bond shear (WBS)**	Cpk = or > 1.67	30 bonds from minimum 5 units	1	5	LotA: 0/5, Cpk>1.67	
WBP	MilStd883- 2011	**Wire Bond Pull (WBP):** Cond. C or D	Cpk = or > 1.67	30 bonds from minimum 5 units	1	5	LotA: 0/5, Cpk>1.67	
SD	JESD22- B102	**Solderability (SD):** 8hr.(1 hr. for Au-plated leads) Steam age prior to test. If production burn-in is done, samples must also undergo burn-in prior to SD.	>95% lead coverage of critical areas	15	0	0	pass	TJN assembly generic data
PD	JESD22- B100	**Physical Dimensions(PD):** PD per FSL 98A drawing	Cpk = or > 1.67	30	0	0	pass	TJN assembly generic data
DIM & BOM		**Dimensional (DIM):** GAO to verify PD results against valid 98A drawing. **BOM Verification (BOM):** GAO to verify qual lot ERF BOM is accurate.					DIM: pass BOM: approved	
SBS	AEC-Q100-010	**Solder Ball Shear (SBS):** Performed on all solder ball mounted packages e.g. PBGA, Chip Scale, Micro Lead Frame (but NOT Flip Chip). Two reflow cycles at MSL reflow temperature before shear.	Cpk = or >1.67	10 (5 balls from a min. of 10 devices)	0	0	not required	For solder ball mounted packages only; NOT for Flip Chips.
LI	JESD22- B105	**Lead Integrity (LI):** Not required for surface mount devices; Only required for through-hole devices.	No lead breakage or cracks	5 (10 leads from each of 5 parts)	0	0	not required	

TEST GROUP E - ELECTRICAL VERIFICATION TESTS

Stress Test	Reference	Test Conditions	End Point Requirements	Minimum Sample Size	# of Lots	Total Units including spares	Results Lot ID-(#Rej/SS) NA=Not Applicable	Comments or Generic Data
TEST	Freescale 48A	**Pre- and Post Functional / Parametrics (TEST):** For AEC, test software shall meet requirements of AEC-Q100-007. Testing performed to the limits of device specification in temperature and limit value.	0 Fails	All	All	All	Completed	This action refers to Final Testing of all qualification units.
HBM	AEC-Q100-002 / JESD22-A114E Jan 2007	**ElectroStatic Discharge/** **Human Body Model Classification (HBM):** Test @ 500/1000/1500/2000/2500/3000/4000/5000/6000 Volts For AEC, see AEC-Q100-002 for classification levels.	TEST @ RH 2KV min.	3 units per Voltage level	0	0	pass	Q224763, MA64(2N22J, TSMC10) 64QFP Qual: 0/3@500V, 0/3@1000V, 0/3@1500V, 0/3@2000V, 0/3@2500V, 0/3@3000V, 0/3@4000V, 0/3@5000V, 0/3@6000V
CDM	AEC-Q100-011	**ElectroStatic Discharge/** **Charged Device Model Classification (CDM):** Test @ 250/500/750(CP)Volts For AEC, see AEC-Q100-011 for classification levels. ***Timed RO of 96hrs MAX.***	TEST @ RH All pins =/> 500V For AEC, Corner pins =/> 750V;	3 units per Voltage level	0	0	pass	generic data: Q224766, MA64(2N22J, TSMC10, 64LQFP): 0/3@250V 0/3@500V 0/3@750V(CP)
LU	JESD78 plus AEC-Q100- 004 for AEC	**Latch-up (LU):** Test per JEDEC JESD78 with the AEC-Q100-004 requirements for AEC. Ta= Maximum operating temperature Vsupply = Maximum operating voltage	TEST @ RH	6	0	0	pass	generic data: Q224763, MA64(2N22J, TSMC10, 64QFP): 0/6
ED	AEC-Q100-009, Freescale 48A spec	**Electrical Distribution (ED)**	TEST @ RHC	5	0	0	pass	Q223690, MA64(0N22J, TSMC10) 64QFP Qual: 0/15 Q224763, MA64(2N22J, TSMC10) 64QFP Qual: 0/5
FG	For AEC, AEC-Q100-007	**Fault Grading (FG)**	FG shall be = or > 90% for qual units				FG%>98%	
EMC	IEC 61967-2 - Radiated Emission Measurement (TEM Cell)	**Electromagnetic Compatibility (EMC)** Test per IEC 61967-2. Ta= Room Temp Vsupply = Typical operating voltage					report available upon request	Done on MA64 TSMC11 QFP64 package

MA64 LQFP 32 7*7*1.4P0.8/6300 BOM

Quartz#	Fab/Mask Set/Tech	Product-Qual Description/Part Number (s)	Die Area (mmxmm)	Assembly Site	Pkg Description/Code	Mold Description	EPOXY Description	Wire Description
224767	TSMC10/N22J/E018AFX5	MKE02Z64(MA64) 32LQFP TSMC10 Qual	2.552x2.305	FSL-TJN-FM	LQFP 32 7*7*1.4P0.8/6300	CEL-9200HF10M CU WIRE	SUMITOMO CRM-1064MBL	25UM CU WIRE

Package Qual Generic data

Quartz#	Fab/Mask Set/Tech	Product-Qual Description/Part Number (s)	Die Area (mm2)	Assembly Site	Pkg Description/Code	Mold Description	EPOXY Description	Wire Description	CAB
223255	TSMC11/0N53H/E018AFX5	9S08PT60	2.454X2.307	FSL-TJN-FM	LQFP 48 7*7*1.4P0.5/6089	CEL-9200HF10M CU WIRE	SUMITOMO CRM-1064MBL	25UM CU WIRE	12522986M
219179	TSMC11/0N35F/E018AFX5	9S08PT16	2.368X1.938	FSL-TJN-FM	LQFP 32 7*7*1.4P0.8/6300	CEL-9200HF10M CU WIRE	SUMITOMO CRM-1064MBL	25UM CU WIRE	11272136M

Die Qual Generic data

Quartz #	Fab/Mask Set/Tech	Product-Qual Description / Part Number(s)	Technology	Fab	Die Size(mmxmm)	CAB Number	CAB Date	Operation Tem
223690/224763	TSMC10/0N22J&2N22J/E018AFX5	MKE02Z64(MA64) 64QFP TSMC10 Qual	E018AFX5	TSMC10	2.552X2.305	13150880M	Dec-12-2013	-40~105C

Revision	Date	Comments	Author
Rev. A	Jan-28-2014	update qual result	Nancy Long