AUTOMOTIVE PRODUCT AEC-Q100G Qualification Test Plan

Objective: Qualification of SOIC 54LD 6.4EP Cu Wire (G630AY MC)

Qual Vehicle PN: Qual Vehicle Name::	**Product A**	Customer Name(s): PN(s):	**General Market**	Test Program ID: Test Program Rev: Rel. Circuits Doc. #:	VARIOUS	Report Type: Revision #: Date:	QUAL RESULTS 1 03Apr14
Technology: Package Description:	**SM5AP** **SOIC 54 300ML 6.4EP**	Mask set#: Revision #:	**XXXX**	CAB #: FSL Qual Quartz Tracking #:	13352188M 224470	Rel. Engr. Approval Signature: Date:	Tian Meng 03Apr14
Fab site: Assembly site: Final Test site: Rel Test site:	**CHD-Fab** **FSL-TJN-FM** **FSL-TJN-FM**	Product Engr: Packaging Engr: Reliability Engr:	**Gary Gavlick** **Li Bo** **Tian Meng**	Target Dates Test Start: Test Finish: PPAP target date:	NA	CAB Approval Signature: Date:	Yanil Cruz 03APR14
Die Size (in mm) W x L x T	**6.083x3.599x0.356**	Part Operating Temp. Range: AEC Grade:	**-40 to 135**	Freescale Contact: Phone Number:	Bai Yun +86-85684236	Customer Approval Signature: Date:	

Stress	JEDEC22 Reference	Test Conditions	End Point Requirements	Minimum Sample Size per lot	# of Lots	Total Units including spares (Note 1)	Results Lot A nominal	Lot B nominal	Lot C nominal	Lot D HH	Lot E LL	Comments (Generic Data: Note 2)
PRE-STRESS REQUIREMENTS/OPTIONS												
PC	A113 J-STD-020	**Preconditioning (PC)** MSL 3 at 260°C, +5/-0°C (Change as needed) CSAM: Note 3	TEST at RH (add C if PC before HTOL); CSAM	All surface mount devices prior to THB/HAST, AC/UHST, TC, PC+PTC, or as required per individual stress Test Conditions.								PC is performed and results reported as part of the individual stress tests.
GROUP A - ACCELERATED ENVIRONMENTAL STRESS TESTS												
HAST	A110	**Highly Accelerated Stress Test (HAST):** PC before HAST if required. HAST = 110°C/85%RH for 264 hrs,528hrs FIO. Bias: per HAST schematic *Timed RO of 48hrs. MAX*	TEST @ RH; CSAM	77	3	240	Precond: 0/77 264hrs: 0/77 528hrs: 0/77	Precond: 0/77 264hrs: 0/77 528hrs: 0/77	Precond: 0/77 264hrs: 0/77 528hrs: 0/77	Precond: 0/77 264hrs: 0/77 528hrs: 0/77	Precond: 0/77 264hrs: 0/77 528hrs: 0/77	
UHST	A118	**Unbiased HAST (UHST):** PC before UHST if required. UHST = 110°C/85%RH for 264 hrs,528hrs FIO. *Timed RO of 48hrs. MAX*	TEST @ R; CSAM	77	3	240	Precond: 0/77 264hrs: 0/77 528hrs: 0/77	Precond: 0/77 264hrs: 0/77 528hrs: 0/77	Precond: 0/77 264hrs: 0/77 528hrs: 0/77	Precond: 0/77 264hrs: 0/77 528hrs: 0/77	Precond: 0/77 264hrs: 0/77 528hrs: 0/77	
TC	A104 AEC Q100-Appendix 3	**Temperature Cycle (TC):** PC before TC if required. TC = -50°C to 150°C for 1000 cycles,2000cycles FIO WBP after qual readpoint on 5 devices from each lot; 2 bonds per corner and one mid-bond per side on each device. Record which pins were used.	TEST @ H WBP =/> 3 grams CSAM	77	3	240	Precond: 0/77 1000cyc: 0/77 2000cyc: 0/77 WP: pass	Precond: 0/77 1000cyc: 0/77 2000cyc: 0/77 WP: pass	Precond: 0/77 1000cyc: 0/77 2000cyc: 0/77 WP: pass	Precond: 0/77 1000cyc: 0/77 2000cyc: 0/77 WP: pass	Precond: 0/77 1000cyc: 0/77 2000cyc: 0/77 WP: pass	
HTSL	A103	**High Temperature Storage Life (HTSL):** HTSL = 150°C for 1008 hrs,2016hrs FIO *Timed RO = 96hrs. MAX*	TEST @ RH	45	1	48	1008hrs: 0/48 2016 hrs: 0/48					
TEST GROUP B - ACCELERATED LIFETIME SIMULATION TESTS												
HTOL	A108	**High Temperature Operating Life (HTOL):** HTOL = 125°C for 1008 hrs,2016hrs FIO Bias:40V *Timed RO of 96hrs. MAX*	TEST @ RHC;	77	3	240	1008hrs: 0/77 2016hrs: 0/77	1008hrs: 0/77 2016hrs: 0/77	1008hrs: 0/77 2016hrs: 0/77			For HTOL drift analysis requirements, see Notes 5 & 6. 3 lots with MM condition
ELFR	AEC Q100-008	**Early Life Failure Rate ELFR):** ELFR = 125°C for 48 hrs; *Timed RO of 48 hrs MAX*	TEST @ RH	800	3	2409	0/800	0/800	0/800			
TEST GROUP C - PACKAGE ASSEMBLY INTEGRITY TESTS												
Full Assy. CZ + Cu WB Cz	FSL Internal Requirement	Full assembly process CZ Data collection per FSL CZ template (for Cu WB) for 3 tech cert lots with nominal Cu WB process. Perform Wire Bond CZ specifically for Copper Wire for 1 HH and 1 LLTech Cert lots.			3		Pass			Pass	Pass	

WBS	AEC Q100-001	**Wire Bond shear (WBS)**	Cpk = or > 1.67	30 bonds from minimum 5 units	3	15	Pass			Pass	Pass	Performed by Assembly Site during qual lot builds - PE to include this requirement in the qual lot build ERF.
WBP	MilStd883-2011	**Wire Bond Pull (WBP):** Cond. C or D	Cpk = or > 1.67	30 bonds from minimum 5 units	3	15	Pass			Pass	Pass	Performed by Assembly Site during qual lot builds - PE to include this requirement in the qual lot build ERF
TEST GROUP D - DIE FABRICATION RELIABILITY TESTS												
TEST GROUP E - ELECTRICAL VERIFICATION TESTS												
TEST	Freescale 48A	**Pre- and Post Functional / Parametrics (TEST):** 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						TEST results is shown for each individual stress test in the qual results report generated upon qual completion. FSL SQA release required for qual test program.
ED	AEC-Q100-009, Freescale 48A spec	**Electrical Distribution (ED)**	TEST @ RHC Cpk = or > 1.67	30	3	90	See Cab presentation			See Cab presentation	See Cab presentation	

General Notes:
1- Optional Spare Units: 'xx+y' indicates additional units have been added to the sample size to be used ONLY in the event of lost or mechanically damaged units so as to have the required number of samples at test completion; these 'spares' shall not be used to replace failing units; ALL failures found in the total sample size shall be recorded and acted upon accordingly.
2- Generic Data: Document source of all generic data in the Generic Data Reference List below.
3- CSAM SS=11 units for each stress test for each lot when required.
5- HTOL Drift Analysis (%drift): Drift analysis will be performed on all 3 HTOL lots, 80 units per lot, and will consist of evaluating the T0 to Treadpoint parametric means of the populations at each readpoint looking for drift that exceeds 10%; [% of drift = (Average value @ Treadpoint - Average value @ T0) / (Limit Max- Limit Min)]
6- HTOL Drift Analysis (Cpk): Any parameter with a Cpk less than 1.67 after the final readpoint will be identified.

Generic Data Reference List:
References shall include (as applicable) Part Number, PPAP#, QUARTZ#, and date data generated. Generic data can not be older than 2 years and must not have ANY valid rejects. CofDC's must be available for all devices used as generic data in order to show applicability to the part being qualified.

Notes:This Data will be used to qualify the following devices: