

**AUTOMOTIVE PRODUCT AEC-Q100G Qualification Test Result**

**Objective: Qualification of Cossilite II OHT Fab SOIC 32 Cu Wire (G630AY MC)**

Qual Vehicle PN: <b>MC33879APEK/R2</b> Qual Vehicle Name: <b>COSSLITE II</b>	Customer Name(s): <b>General Market</b> PN(s):	Test Program ID: <b>VARIOUS</b> Test Program Rev:	Report Type: <b>QUAL RESULT</b> Revision #: <b>0</b> Date: <b>10Jan14</b>
Technology: <b>SM5AP</b> Package Description: <b>SOIC 32 300ML 5.7EP</b>	Mask set#: <b>N93C</b> Revision #:	Rel. Circuits Doc. #: CAB #: <b>13342134M</b> FSL Qual Quartz Tracking #:	Rel. Engr. Approval Signature: <b>Tian Meng</b> Date: <b>10Jan14</b>
Fab site: <b>OHT-Fab</b> Assembly site: <b>FSL-TJN-FM</b> Final Test site: <b>FSL-TJN-FM</b> Rel Test site:	Product Engr: <b>Tiffany Le</b> Packaging Engr: <b>Hosoda Daisuke</b> Reliability Engr: <b>Tian Meng</b>	Target Dates: <b>NA</b> Test Start: Test Finish: PPAP target date:	CAB Approval Signature: <b>Yanil Cruz</b> Date: <b>16Jan2014</b>
Die Size (in mm) <b>3.82x3.49</b> W x L x T	Part Operating <b>-40 to 125</b> Temp. Range: AEC Grade:	Freescale Contact: <b>Bai Yun</b> Phone Number: <b>+86-85684236</b>	Customer Approval Signature: Date:

**PRE-STRESS REQUIREMENTS/OPTIONS**

Stress	JEDEC22 Reference	Test Conditions	End Point Requirements	Minimum Sample Size per lot	# of Lots	Total Units including spares (Note 1)	Results			Comments (Generic Data: Note 2)
							Lot A	Lot B	Lot C	
<b>PC</b>	A113 J-STD-020	<b>Preconditioning (PC)</b> 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**

<b>HAST</b>	A110	<b>Highly Accelerated Stress Test (HAST):</b> PC before HAST if required. HAST = 110°C/85%RH for 264hrs,528hrs FIO Bias: per HAST schematic Timed RO of 48hrs. MAX	TEST @ RH; CSAM	77	3	240	0/80	0/79	0/80	When biased humidity is required either HAST or THB can be performed. <b>HAST is the preferred biased humidity test.</b>
<b>UHST</b>	A118	<b>Unbiased HAST (UHST):</b> PC before UHST if required. UHST = 110°C/85%RH for 264hrs,528hrs FIO Timed RO of 48hrs. MAX	TEST @ R; CSAM	77	3	240	0/80	0/80	0/80	<b>When unbiased humidity testing is required, UHST is the preferred unbiased humidity test. The AC option is NOT recommended.</b>
<b>TC</b>	A104 AEC Q100-Appendix 3	<b>Temperature Cycle (TC):</b> PC before TC if required. TC = -50°C to 150°C for 1000cycles,2000 cycles 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	0/80	0/80	0/80	If WP is to be performed at interim readpoints, add additional samples so that the minimum sample size is maintained for the final readpoint.
<b>HTSL</b>	A103	<b>High Temperature Storage Life (HTSL):</b> HTSL = 150°C for 1008hrs, 2016hrs FIO Timed RO = 96hrs. MAX	TEST @ RH	45	1	48	0/48			

**TEST GROUP B - ACCELERATED LIFETIME SIMULATION TESTS**

<b>HTOL</b>	A108	<b>High Temperature Operating Life (HTOL):</b> HTOL = 125°C for 1008hrs, 2016hrs FIO Bias:5V and 16V Timed RO of 96hrs. MAX	TEST @ RHC;	77	3	240	0/80	0/80	0/80	<b>For HTOL drift analysis requirements, see Notes 5 &amp; 6.</b>
<b>ELFR</b>	AEC Q100-008	<b>Early Life Failure Rate (ELFR):</b> ELFR = 125°C for 48 hrs; Timed RO of 48 hrs MAX	TEST @ RH	800	3	2409	0/803	0/803	0/803	

**TEST GROUP C - PACKAGE ASSEMBLY INTEGRITY TESTS**

<b>WBS</b>	AEC Q100-001	<b>Wire Bond shear (WBS)</b>	Cpk = or > 1.67	30 bonds from minimum 5 units	3	15	Pass >1.67	Pass >1.67	Pass >1.67	Performed by Assembly Site during qual lot builds - PE to include this requirement in the qual lot build ERF.
<b>WBP</b>	MilStd883-2011	<b>Wire Bond Pull (WBP):</b> Cond. C or D	Cpk = or > 1.67	30 bonds from minimum 5 units	3	15	Pass >1.67	Pass >1.67	Pass >1.67	Performed by Assembly Site during qual lot builds - PE to include this requirement in the qual lot build ERF

**TEST GROUP E - ELECTRICAL VERIFICATION TESTS**

<b>TEST</b>	Freescale 48A	<b>Pre- and Post Functional / Parametrics (TEST):</b> 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.
<b>ED</b>	AEC-Q100-009, Freescale 48A spec	<b>Electrical Distribution (ED)</b>	TEST @ RHC Cpk = or > 1.67	30	3	90	Pass >1.67	Pass >1.67	Pass >1.67	

**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.