



MICROCHIP

QUALIFICATION PLAN SUMMARY

PCN #: LIAL-09YRLG884

Date
July 26, 2018

Qualification of MMT as an additional assembly site for selected Atmel products of 66.11K, 66.15K, 66.26K wafer technology available in 100L TQFP (14x14x1mm) package. This is a Q006 grade 2 qualification

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		Qualification Report
<u>Miscellaneous</u>	Assembly site	MMT
	BD Number	BDM-001908 rev. C
	MP Code (MPC)	662A77E5XC01
	Part Number (CPN)	ATMXT225T-AT
	CCB	3498
<u>Lead-Frame</u>	Paddle size	240x240 mils
	Material	C7025
	Surface	Bare Cu
	Treatment	BOT
	Process	Etched
	Lead-lock	No
	Part Number	10110004
	Lead Plating	Matte Tin
<u>Bond Wire</u>	Material	CuPdAu
	Wire Diameter	0.8 mils
<u>Die Attach</u>	Part Number	3280
	Conductive	Yes
<u>Mold Compound</u>	Part Number	G700HA
<u>PKG</u>	PKG Type	TQFP
	Pin/Ball Count	100
	PKG width/size	14x14x1.0mm
<u>Die</u>	Die Thickness	11 mils
	Die Size	130.0x163.0 mils
	Fab Process (site)	66.26K/UMC

Test Name	Conditions	Reliability Stress Read Point	Pre & Post Reliability Stress Test Temperature	Sample Size	Min. Qty of Spares per Lot (should be properly marked)	Qty of Lots	Total Units	Fail Accept Qty	Est. Dur. Days	Special Instructions
		-40°C to +105°C datasheet operating range (V Temp)	-40°C to +105°C datasheet operating range (V Temp)							
Standard Pb-free Solderability	JESD22B-102E; Perform 8 hour steam aging for Matte tin finish and 1 hour steam aging for NiPdAu finish prior to testing. Standard Pb-free: Matte tin/ NiPdAu finish, SAC solder, wetting temp 245°C for both SMD & through hole packages.			22	5	1	27	> 95% lead coverage	5	Standard Pb-free solderability is the requirement. SnPb solderability (backward soldering) is required for any plating related changes and highly recommended for other package BOM changes.
Backward Solderability	JESD22B-102E; Perform 8 hours steam aging for Matte tin finish and 1 hour steam aging for NiPdAu finish prior to testing. Backward: Matte tin/ NiPdAu finish, SnPb solder, wetting temp 215°C for SMD.			22	5	1	27	> 95% lead coverage	5	
Bonding Optimization DOE	Per MCHP specification PI-76005									Results of DOE must be approved by Microchip engineer prior to start the assembly of qualification lots
CSAM	IPC/JEDEC J-STD-035			EITHER the same 11 components per lot through each readpoint (preferable) OR 22 random components per lot at each readpoint.						Delamination of the mold compound over the Cu ball or stitch bond could lead to joint fatigue failure at either weld joint. The delamination criteria for various stages of qualification testing are shown in AEC-Q006 Table 1.

Test Name	Conditions	Reliability Stress Read Point	Pre & Post Reliability Stress Test Temperature	Sample Size	Min. Qty of Spares per Lot (should be properly marked)	Qty of Lots	Total Units	Fail Accept Qty	Est. Dur. Days	Special Instructions
		-40°C to +105°C datasheet operating range (V Temp)	-40°C to +105°C datasheet operating range (V Temp)							
Wire Bond Pull - WBP	Mil. Std. 883-2011			3	0	3	Pull/shear as many as is possible per the number of wires per device to be qualified up to a maximum of 30 wires/balls from the total sample size specified.	Cpk>1.3 3 or Ppk ≥1.67 or 0 fails after TC	5	Wire pull / ball shear is performed after stress testing and decapsulation.
Wire Bond Shear - WBS	CDF-AEC-Q100-001			3	0	3	Pull/shear as many as is possible per the number of wires per device to be qualified up to a maximum of 30 wires/balls from the total sample size specified.	Cpk>1.3 3 or Ppk >1.67	5	Wire pull / ball shear is performed after stress testing and decapsulation..

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Cross Sectioning	IPC-TM-650, Methods 2.1.1 and 2.1.1.2 Criteria of examination: - Ball bond area - Amount and distribution of intermetallic - an alternative planar analysis method to evaluate ball bond IMC formation is also acceptable - Crack initiation/propagation - Corrosion after 1x - Wedge bond area - Amount of contact - Wire angle to wedge - Crack initiation/propagation - Corrosion after 1x - Intermetallics formed in the bond area			1	0	3	3		5	For initial supplier qualification of a new die/package (interaction) family/technology, components from the CSAM after TC stressing showing both no delamination and delamination over a bond(s) are to be used for cross-sectioning. The sample sizes, test conditions and acceptance criteria are specified in the overall process qualification flow per AEC-Q006 Table 2.
Physical Dimensions	Measure per JESD22 B100 and B108			10	0	3	30	0 and Cpk>1.3 3 or Ppk ≥1.67	5	
External Visual	Mil. Std. 883-2009/2010			All devices prior to submission for qualification testing	0	3	ALL	0	5	
HTSL (High Temp Storage Life)	JESD22A-103. +175°C, 2x Stress Electrical test pre and post stress at +25°C and hot temp at 105C Cross-section 3 units (1unit/lot) post test, first read point 2X for stress remaining 44 units/lot Cross-section 3 units (1 unit/lot) post test, 2nd read pont	500 hrs, 1000 hrs	+25°C, +105°C	45	5	1	50	0	10	Perform per the requirements in AEC-Q100/Q101. Spares should be properly identified.

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		-40°C to +105°C datasheet operating range (V Temp)	-40°C to +105°C datasheet operating range (V Temp)							
	All lots to be tested at 105C hot temp testing.									
Preconditioning - Required for surface mount devices	+150°C Bake for 24 hours, moisture loading requirements per MSL level + 3X reflow at peak reflow temperature per Jedec-STD-020E for package type. Electrical test pre and post stress at +25°C. Perform SAM analysis using 45 samples per lot. MSL1/260C MSL3/260C		+25°C, +105°C	231	15	3	738	0	15	Spares should be properly identified. 77 parts from each lot to be used for HAST, Autoclave, Temp Cycle test. MSL1 is the target for CCB 3498 qual, MSL3 is a backup.
HAST	+130°C/85% RH for 96hrs + 192hrs. Electrical test pre and post stress at +25°C and hot temp at +105°C CSAM post 96 hours Ball/sitch pull 3 units per lot (30 max) Ball shear 3 units per lot (30 max) Cross-section 1 unit per lot CSAM post 192 hours Ball/sitch pull 3 units per lot (30 max) Ball shear 3 units per lot (30 max) Cross-section 1 unit per lot All lots to be tested at 105C hot temp testing	96 hrs + 192 hrs	+25°C +105°C	77	5	3	246	0	10	Perform per the requirements in AEC-Q006. Spares should be properly identified. Use the parts which have gone through Pre-conditioning.
Unbiased HAST	+130°C/85% RH for 96hrs + 192hrs. Electrical test pre and post stress at +25°C	96 hrs + 192 hrs	+25°C	77	5	3	246	0	10	Spares should be properly identified. Use the parts which have gone through Pre-conditioning.

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		-40°C to +105°C datasheet operating range (V Temp)	-40°C to +105°C datasheet operating range (V Temp)							
Temp Cycle	PC before TC Grade 2: -65°C to +150°C for 500 cycles (1x stress) and 1000 cycles for (2x stress). CSAM @ T0; post 1x stress Ball/sitch pull 3 units per lot (30 max) Ball shear 3 units per lot (30 max) Cross-section 1 unit per lot CSAM post 2x stress Ball/sitch pull 3 units per lot (30 max) Ball shear 3 units per lot (30 max) Cross-section 1 unit per lot Electrical Test Pre and Post Stress at Hot Temp All lots to be tested at 105C hot temp testing	500 cycles (1x stress); 1000 cycles (2x stress).	+105°C	77	5	3	246	0	15	Perform per the requirements in AEC-Q006. Spares should be properly identified. Use the parts which have gone through Pre-conditioning