AMPLEON

TO270 types _ transfer of assembly process (Final PCN)

June 27th 2022

Background

- Currently, related TO270 products are assembled in Huashan China
- As part of the RoHS compliance program, the assembly will be transferred to AMPLEON Philippines (AMP), replacing the lead containing soft solder for Ag Sinter.
- Transferred devices are targeted to match exact (performance, dimensions).

Changes

Description	From	To	Rationale
Assembly Location	Huashan (China)	AMP (Philippines)	RoHS compliance (no Ag Sinter capability in Huashan).
Die bond material	Soft Solder	Ag Sinter	
Leadframe surface finish	PPF	Copper	Delamination control Same base metal (C194/TAMAC 4)
Plating deflash	Chemical deflash	Electrolytic deflash	ED is released on OMP1/780/400
Other BOM's	-	-	No change

Qualification Plan

TO270 package release in AMP:

The TO270 package platform is qualified using different TO270 products as carriers to cover the different die sizes and die types. The qualification plan is described in the next slides.

These TO270 products will be released based on *match exact* product performance.

Carrier products are BLP9G0722-20(G)andBLP9H10-30G

Qualification Plan

CONANA and RELIABILITY TESTS

Test	Test Conditions	Response/ Acceptance Criteria	Measurement Method	# Lots	Sample Size (pcs) per lot
MSLA - L1 @245degC	3x reflow	No die top delamination, No electrical Test fail	SCAT and DC Test	3 – QUAL Lots per device carrier	45 pcs / 1 lot per device
MSLA - L2 @245degC	3x reflow	No die top delamination, No electrical Test fail	SCAT and DC Test		45 pcs / 1 lot per device
MSLA - L3 @245degC	3x reflow	No die top delamination, No electrical Test fail	SCAT and DC Test		45 pcs / 1 lot per device
MSLA - L3 @260degC	3x reflow	No die top delamination, No electrical Test fail	SCAT and DC Test		45 pcs / 1 lot per device
TMCL(-65degC/+150degC) w/ MSL precon 245	3x reflow, 500c, 1000c (req'd), 1500c, 2000c, 3000c	No die top delamination, No electrical Test fail	SCAT and DC Test		77 pcs / lot per device
TMCL(-65degC/+150degC) w/ MSL precon 260	3x reflow, 500c, 1000c (req'd), 1500c, 2000c, 3000c	No die top delamination, No electrical Test fail	SCAT and DC Test		77 pcs / lot per device
TMCL(-65degC/+175degC) w/ MSL precon 245	3x reflow, 500c, 1000c, 1500c, 2000c, 3000c	No die top delamination, No electrical Test fail	SCAT and DC Test		77 pcs / 1 lot per device
HAST (130degC/85%RH/1.5Vs) w/ MSL precon 245	3x reflow, 96hrs (req'd), 192hrs	No die top delamination, No electrical Test fail	SCAT and DC Test		25 pcs / lot (BLP15H9S100/ BLP15H9S100G Only)

Qualification Plan

CONANA and RELIABILITY TESTS

Test	Test Conditions	Response/ Acceptance Criteria	Measurement Method	# Lots	Sample Size (pcs) per lot
uHAST (130degC/85%RH) w/ MSL precon 245	3x reflow, 96hrs (req'd), 192hrs	No die top delamination, No electrical Test fail	SCAT and DC Test	3 – QUAL Lots per device carrier	77 pcs / lot per device
HTSL 150degC	504hr, 1008hr (req'd), 1512hr, 2016hr	No die top delamination, No electrical Test fail	SCAT and DC Test		77 pcs / lot per device
HTSL 175degC	504hr, 1008hr 1512hr, 2016hr	No die top delamination, No electrical Test fail	SCAT and DC Test		77 pcs / 1 lot per device
TFAT (1 min/1 min; delta T=155degC; Tj=225degC; Ths=70degC)	5 kycles (168 hrs) ; 10kcyles (336 hrs) - req'd; 15kcyles (500 hrs); 30kycles (1000 hrs)	No die top delamination, No electrical Test fail	SCAT and DC Test		25 pcs / lot BLP0408H9S30 Only
ConAna	X-ray/ SCAT/ Dimensional/ Solderability Test/ Lead bend Test/ Lead Pull Test/ Decapsulation/ Wire Pull Test/ Cross Section	No reject as per outstanding criteria	Microsection SEM/EDX Solderability test (Dip&Look), SAM		50 pcs/ 1 lot per device

Reliability and Construction Analysis results on carrier products

Results

Reliability Tests	Readpoints	LOT (ss)	small die - LM8HV 50V	med die - LM8HV 50V	large die - LM8 32V	HAR die - LM8 12V
			BLP0408H9S30 (for TFAT; need in GW form)	BLP15H9S100/ BLP15H9S100G	BLP15M9S100/ BLP15M9S100G	BLP5LA55S
			3.20 x 1.80 x 0.050 (1)	5.50 x 1.80 x 0.050 (1)	6.00 x 1.80 x 0.050 (1)	6.00 x 1.45 x 0.050 (1)
			VL8G3W018NF1-50B	VL8G4W067PF1-50B	VL8G0W100XA1-50	VL8G2W225EA2
			# Lot	# Lot	# Lot	# Lot
MSLA - L1 @260degC	3x reflow	1Quallot (45)	N/A	PASS	PASS	PASS
MSLA - L2 @260degC	3x reflow	1Quallot (45)	PASS	PASS	PASS	PASS
MSLA - L3 @260degC	3x reflow	1Quallot (45)	PASS	PASS	PASS	PASS
TMCL(-65degC/+150degC) w/ MSL1 precon 260	3x reflow, 500c, 1000c	1Quallot (77)	N/A	PASS	PASS	PASS
TMCL(-65degC/+150degC) w/ MSL2 precon 260	3x reflow, 500c, 1000c (req'd), 1500c, 2000c, 3000c	1Quallot (77)	PASS	PASS	PASS	PASS
TMCL(-65degC/+150degC) w/ MSL3 precon 260	3x reflow, 500c, 1000c (req'd), 1500c, 2000c, 3000c	1Quallot (77)	PASS	PASS	PASS	PASS
		2Quallot (77)	PASS	PASS	PASS	PASS
		3Quallot (77)	PASS	PASS	PASS	PASS
TMCL(-65degC/+175degC) w/ MSL3 precon 260	3x reflow, 500c, 1000c,	1Quallot (77)	PASS	PASS	PASS	PASS
HAST (130degC/85%RH/1.5Vs) w/ MSL precon 245	3x reflow, 96hrs (req'd), 192hrs	1Quallot (25)	N/A	PASS	N/A	N/A
		2Quallot (25)		PASS		
		3Quallot (25)		PASS		
uHAST (130degC/85%RH) w/ MSL3 precon 260	3x reflow, 96hrs (req'd), 192hrs	1Quallot (77)	PASS	PASS	PASS	PASS
		2Quallot (77)	PASS	PASS	PASS	PASS
		3Quallot (77)	PASS	PASS	PASS	PASS
HTSL 150degC	504hr, 1008hr (req'd), 1512hr, 2016hr	1Quallot (77)	PASS	PASS	PASS	PASS
		2Quallot (77)	PASS	PASS	PASS	PASS
		3Quallot (77)	PASS	PASS	PASS	PASS
HTSL 175degC	504hr, 1008hr 1512hr, 2016hr	1Quallot (77)	PASS	PASS	PASS	PASS
TFAT (1 min/1 min; delta T=70/50degC; Tj=140/120degC; Ths=70degC)	5 kycles (168 hrs) ; 10kcyles (336 hrs) - req'd; 15kcyles (504 hrs); 30kcycles (1000 hrs)	1Quallot (30)	PASS	NA	NA	NA
		2Quallot (30)	PASS			
ConAna	post assembly	1Quallot	PASS	PASS	PASS	PASS
MAD Study	post assembly	1Quallot	Recommended Drybake - 4hrs only @ 125°C