Product Change Notice (PCN)

Subject: Change in Solder Ball Materials and Substrate Manufacturing Location
Publication Date: 6/11/2024
Effective Date: 9/10/2024

Revision Description:
Initial Release

Description of Change:
Renesas is changing the solder ball materials from SAC305 to LF35 to improve solder ball adhesion to substrate.

In addition, the substrate manufacturing location will change from UMTC SY to UMTC HF due to the complete transfer of substrate to UMTC SY site.

Both the SY and HF facilities have the same process flow, in-process controls and same design capability. No key equipment differences noted.

Refer Appendix A for more details.

Affected Product List: Refer Appendix B.

Reason for Change:
To improve solder ball adhesion and to ensure supply continuance.

Impact on Fit, Form, Function, Quality & Reliability:
The change will have no impact on the product form, fit, function, quality, reliability and environmental compliance of the products. Existing inventory can be used to fulfill orders.

Product Identification:
Date code: F6923: 2307
F6922: 2402
F6921: 2426

Qualification Status: Internal qualification completed successfully. Refer Appendix C
Sample Availability Date: Immediately for F6922 and F6923, F6921 end of June'2024
Material Declaration: Available on request
Note:

1. Acknowledgement must be received by Renesas within 30 days or Renesas will consider the change as approved.
2. If timely acknowledgement is provided by Customer, then Customer shall have 90 days from the date of receipt of this PCN to make any objections to this PCN. If Customer fails to make objections to this PCN within 90 days of the receipt of the PCN then Renesas will consider the PCN changes as approved.
3. If customer cannot accept the PCN then customer must provide Renesas with a last time buy demand and purchase order.

For additional information regarding this notice, please contact idt-pcn@lm.renesas.com

Appendix A – Comparison data

1. Solder ball materials

Physical Properties	SAC305	LF35
Composition	Sn-3Ag-0.5Cu	Sn-1.2Ag-0.5Cu-0.05Ni
Supplier	PMTC	PMTC
Melting Point [°C]	216-224	217-228
Density [g/cm3]	7.34	7.31
Electrical Resistivity [u	11.15	10.21
Thermal Conductivity	54.54	54.19
Specific Heat [J/kg*°C]	231	308
Vickers Hardness [HV]	16.08	12.77
Poisson's ratio	0.35	0.443
Tensile Strength (MPa]	56	36
Elogation [%]	50	48
CTE(ppm/°C)	30.18	23.48
Young's(Gpa)	38.13	28.46

2. Substrate site: SF versus HF

- SF and HF use the same substrate specification manufactured for F692x.

Appendix B – Affected Product List

F6921AVRI	F6922AVRI	F6923AVRI
F6921AVRI8	F6922AVRI8	F6923AVRI8

Package Qualification Report

Date: 3/22/2024

Product : F692X			
Fab Base:	AP853P011	Process Technology:	SBC18H5L, 1P6M
Package Types:	FCCSP 23	Fab Location:	TowerJazz
Qual Plan:	P23-08-005	Assembly Location:	ASEC - Taiwan

Test Description	Conditions	Sample Size	Results (rej/SS)	Comments
Temperature Cycling [1]	JESD22-A104, -55°C to +125°C, 700 cycles	77	0/77	Pass
Solder Ball Shear	JESD22-B117	5	0/5	Pass
Solder Ball Shear	JESD22-B117, post 1000 hrs bake @ 150°C	5	0/5	Pass

Note:

1. With preconditioning per JESD22-A113, MSL3 (260°C)

Package Qualification Test Report

Qualification Purpose: To qual AVR23 substrate 37-1053-023 & 37-1054-023 from HF plant

Qualification Vehicle F6921ZRAVRI / F6922ZSAVRI
Assembly Location ASEC
Report Date April 17, 2024

Qual Vehicle Information

	Lot 1	Lot 2
Package Type	FCCSP 23	FCCSP 23
Package Dimension	2.70 x 2.70 x 0.90	2.70 x 2.70 x 0.90
Ball Pitch	0.50 mm	0.50 mm
Die Bump Material	Copper Pillar 40Cu3Ni27SnAg	Copper Pillar 40Cu3Ni27SnAg
Solder Ball	SAC305	SAC305
Mold Compound Material	EME-G311A	EME-G311A
Substrate	HL832NS-E+SR1	HL832NS-E+SR1
Substrate Supplier	UMTC HF	UMTC HF

Qualification Test and Results (Reference JEDEC JESD47)

		Sample Size/Reject	
		FCCSP 253	FCCSP 253
Stress Tests	**Reference Spec / Conditions**	**Lot 1**	**Lot 2**
Temperature Humidity Bias* (HAST)	JESD22-A110 / 130 °C, 85% RH, Vccmax, 96 hours	25/0	25/0
Temperature Cycling*	JESD22-A104 / –55 °C to +125 °C, 1000 cycles	25/0	25/0
Solder Ball Shear Test	JESD22-B117, 1000 hours	5/0	5/0
Moisture Sensitivity Level, MSL	IPC/JEDEC J-STD-020C, Level 3, 260°C	25/0	25/0

* Preconditioning sequence according to JESD22-A113 prior to stress test.

Remarks: Missing solder balls was encoutered during the ATE of the qual lots due to poor metallurgy (SAC305 (no Ni content) + Cu-OSP finish).
A qualification with solder ball alloy LF35 to improve the metallurgy in P23-08-005 has been completed and passed.