Product Change Notification

(Notification - P1610046-DIGI)

(PC-PKG-S002A/E)

October 3, 2016

To: *Our Valued Digi-Key, Inc. Customer*

Overview: The purpose of this notification is to communicate product change of select Renesas Electronics America, Inc. (REA) devices.

Due to the Kumamoto earthquake in April 2016, the plating process was temporarily changed to from Kumamoto Bosei Kogyo Co. (*Bosei*) to J-Devices Kumamoto (*JD Kumamoto*) and Mihara Kinzoku Kogyo Co. (*Mihara*). This back-up production started in May 2016. This was done in order to ensure continuation of product production.

This notification announces the permanent addition of JD Kumamoto and Mihara as plating factories. There is no change to part numbers or product reliability. See the appendix for additional details.

Affected Products: A review of our shipment records to your company indicate the attached list of products is affected by this notification.

Booking Part Number
M30624FGPFP#U9C
M30800SFP-BL#U5
M30833FJFP#U3
M30833FJFP#U5
M30853FHFP#U3
M30853FHFP#U5

Part numbers given in this list are for active part numbers in REA database at the time of this notification.

Key Dates:

Cross shipments from REA of products using the additional plating factories.	**May 1, 2016**

Response: No response is required. REA will consider this notification approved 30 days after its issue.

Please contact your REA sales representative for any questions or comments.

Thank you for your attention.

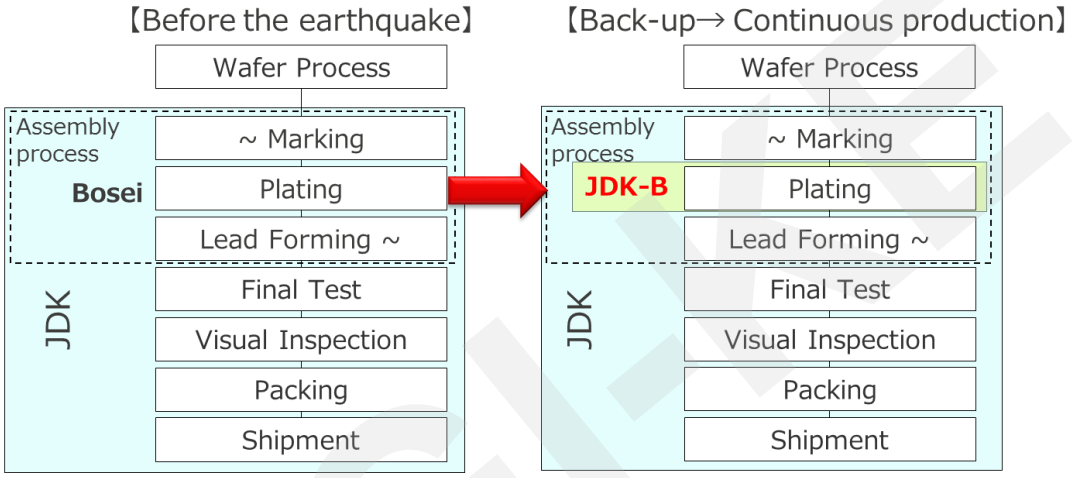
Sincerely,

Renesas Electronics America, Inc.

Appendix A: Site Change of SnCu Plating on 42 Alloy Frame

The plating process was temporarily transferred from Bosei to J-Devices Kumamoto. This back-up production started in mid-May 2016, and will now continue as fixed production.

1. Detail of the change.



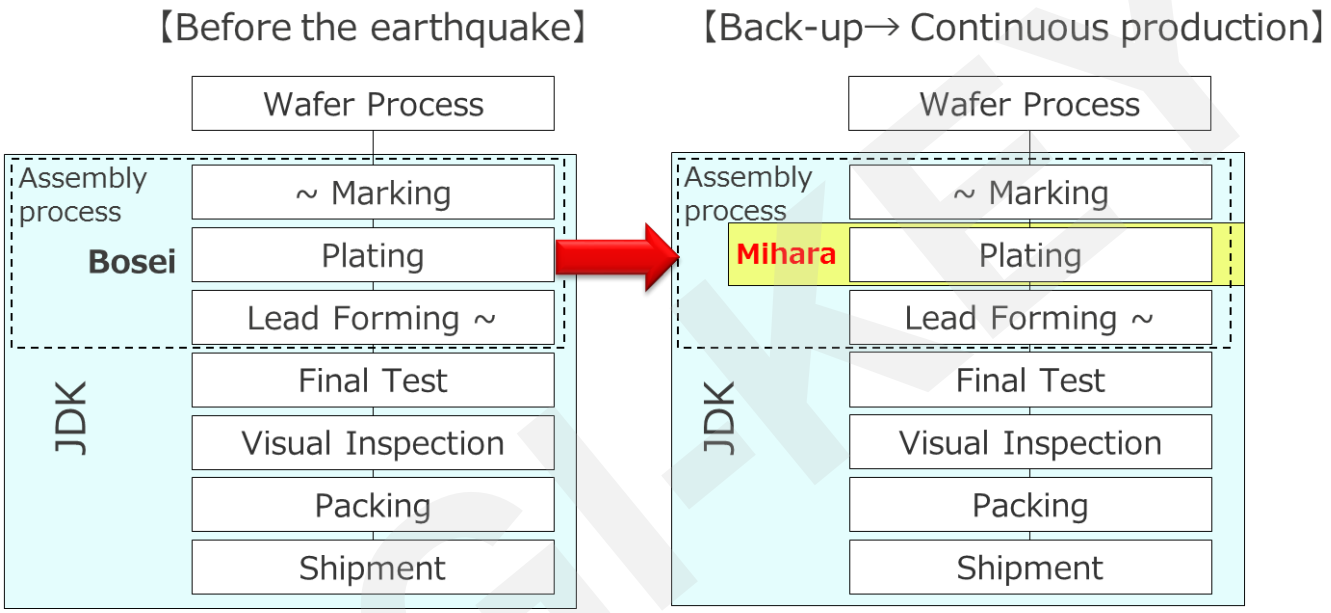
2. Risk assessment: Product quality has been kept at the same level as Bosei.

4M+1E	Risk Assessment Results	
Machine	Type change	Rack type → Seat type
Method(Process)	Equivalent	Plating method is same (Electroplating)
Material	Same material	Plating materials are same
Man	Certificated operators	Certified by equivalent level standard
Environment	Equivalent	Same level as Bosei

Appendix B: Site Change of Sn-Pb Plating on Cu Frame or 42 Alloy Frame

The plating process was temporarily transferred from Bosei to Mihara. This back-up production started in mid-May 2016, and will now continue as fixed production.

1. Detail of the change.

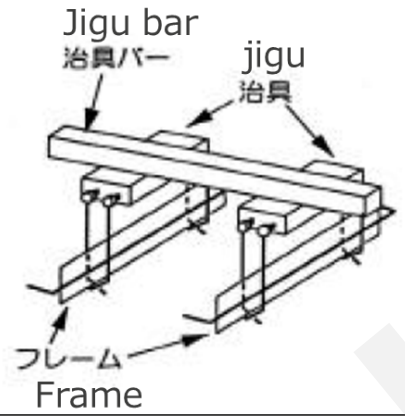
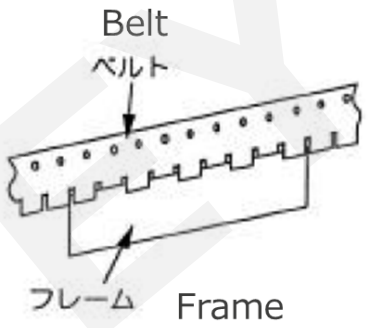


2. Risk assessment: Product quality has been kept at the same level as Bosei.

4M+1E	Risk Assessment Results	
Machine	Type change	Rack type → Seat type
Method(Process)	Equivalent	Plating method is same (Electroplating)
Material	Same material	Plating materials are same
Man	Certificated operators	Certified by equivalent level standard
Environment	Equivalent	Same level as Bosei

Appendix C: Description of the Sheet Type of Plating Equipment

Rack type and sheet type of plating equipment is shown below.

item	Rack type	sheet type
Equipment structure		
Changing point	Rack type plating equipment is the plating equipment of the system that transports put the lead frame in the jig (frame rack).	Frame transport method, from the transport that was placed on the jig (frame rack), is a change to the method of transport to clamp to the conveyor belt.
inspection result	belt from the system to put the jig (frame rack), there is a fear of falling from the belt. It is confirmed that there is no problem to examine falling during transport. (Plating equipment of sheet formula has been applied to many other semiconductor external lead plating JD Kumamoto)	

Appendix D: Process Capability

Below are the process capability (Cpk) calculated from the current products in each fab. All Cpk's are over 1.67, no problems found.

Process	Item	Composition	Process Capability (Cpk)			Judge
			Bosei	JD kumamoto	Mihara	
Plating	Thickness	Sn-Cu	2.15	2.15		Pass
		Sn-Pb	1.79		1.75	Pass
	Solder Wettability (Zero Cross Time)	Sn-Cu	Over 3	Over 3		Pass
		Sn-Pb	Over 3		Over 3	Pass

Sn-Cu: Bosei to JD Kumamoto
Sn-Pb: Bosei to Mihara

Appendix E: Results of Quality Evaluation

1. Solder Wettability Test
   (a) Sn-Cu plating (JD Kumamoto and Bosei)
   Solder wetting area and zero cross time are within specification, passed.

Plating site	Composition	Zero Cross Time (sec.)			Solder Wetting Area NG count	Judge
		Max.	Min.	Ave.		
JD Kumamoto	Sn-Cu	0.37	0.28	0.33	0/5 pcs	Pass
Bosei	Sn-Cu	0.44	0.31	0.36	0/5 pcs	Pass

   Pre-treatment: 175 C, 15Hr
   Specification: Zero cross time less than 3 sec., solder wetting area over 95%.

   (b) Sb-Pb plating (Mihara and Bosei)
   Solder wetting area and zero cross time are within specification, passed.

Plating site	Composition	Zero Cross Time (sec.)			Solder Wetting Area NG count	Judge
		Max.	Min.	Ave.		
Mihara	Sn-Pb	0.21	0.16	0.16	0/5 pcs	Pass
Bosei	Sn-Pb	0.50	0.40	0.40	0/5 pcs	Pass

   Pre-treatment: 175 C, 15Hr
   Specification: Zero cross time less than 3 sec., solder wetting area over 95%.

2. Reliability Test
   Taking account of the contamination on the lead, chose the smaller package with short length from the outer lead edge to chip edge.

Sample Package	Plating	Frame Material	Test Item	Failure Count
LQFP7mm 32pin	Sn-Pb	Cu	High temperature storage test 1000Hr	0/45
			Unsaturated PCT test 240Hr	0/77
			Temperature cycling test 500cycles	0/77
QFP10mm 44pin		42Alloy	High temperature storage test 1000Hr	0/45
			Unsaturated PCT test 240Hr	0/77
			Temperature cycling test 500cycles	0/77
QFP10mm 44pin	Sn-Cu	42Alloy	High temperature storage test 1000Hr	0/45
			Unsaturated PCT test 240Hr	0/77
			Temperature cycling test 500cycles	0/77

Appendix F: About Mihara Kinzoku Kogyo Co.

Mihara Kinzoku Kogyo Co. is a major outsourcing company of outer plating for J-Devices Fukuoka, and is a major manufacturing partner for J-Devices.

1. Location: Yahatanishi-ku, KitaKyushu-shi

2. Plating achievement

Plating Material	Number of Package	Number of Type	Production Volume (Kframes/month)
Sn-Ag	84	764	1,004
Sn-Bi	52	942	687
Sn	6	31	469
Sn-Pb	10	11	5
Total	152	1,748	2,165

3. Certification
   - ISO9001:2008 Certified as J-Device Sub-Site
   - ISO/TS16949:2009 Certified as J-Device Sub-Site
   - ISO14001:2004