SEIKO EPSON CORPORATION
Microdevices Operations Division
http://www.epson.com

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Doc.1

Feb, 20, 2015

To Our Valued Distributors,

[NOTICE] Terminal Plating Change

First of all, we would like to take this opportunity to thank you for the excellent business relationship between the two companies and we look forward to a successful continuous partnership in the future.

1. Change Item **: Terminal plating (Sn-Bi to Pure-Sn)**

Please refer to attached Appendix for detail of the change and evaluation result.

2. Reason and Background

In order to unify specifications of plating and to promote "Pure-Sn" plating of terminal

As you know, demand for environmentally friendly semiconductor products has risen day by day. Number of customers who demand "Bismuth -free terminal plating" is also increasing. We have individually corresponded about the demand. By the individual correspondences, number of specification of the Pure-Sn plating has increased and the specifications made working efficiency worse. We like to unify specifications of terminal plating, promoting "Pure Sn" plating.

3. Applicable Products : Please see next page

4. Schedule : Sep, 1, 2015 ~

We will start shipment of pure Sn plated product in Sep 2015.
Actual timing of each product will be fixed, depending on order volume & inventory status.

If you have any questions, please let us know by Mar.31 2015.
I appreciate your understanding and cooperation

Sincerely yours,

Tom Sakashita
General Manager,
Device Sales & Marketing Dep.
Micro Devices Operations Division

Applicable Products

P/N	PKG TYPE
S1C17564F111100	TQFP13-64Pins
S1C17F57F401100	QFP15-128Pins
S1C17M01F00C100	TQFP13-64Pins
S1C17Y05F00C100	TQFP12-48Pins
S1D13503F01A200	QFP15-100Pins
S1D13504F00A200	QFP15-128Pins
S1D13505F00A200	QFP15-128Pins
S1D13506F00A200	QFP15-128Pins
S1D13513F01A100	QFP22-208Pins
S1D13515F00A100	QFP22-256Pins
S1D13517F00A100	QFP15-128Pins
S1D13700F01A100	TQFP13-64Pins
S1D13700F02A100	TQFP13-64Pins
S1D13704F00A200	QFP14-80Pins
S1D13705F00A200	QFP14-80Pins
S1D13706F00A200	TQFP15-100Pins
S1D13719F00A100	QFP8-208Pins
S1D13742F01A200	QFP20-144Pins
S1D13743F00A200	QFP20-144Pins
S1D13746F01A600	QFP15-128Pins
S1D13748F00A100	QFP20-144Pins
S1D13781F00A100	QFP15-100Pins
S1D13A04F00A100	TQFP15-128Pins
S1D13A05F00A100	QFP5-128Pins
S1D13U11F00A100	QFP20-144Pins
S1R72013F00A100	QFP13-64Pins
S1R72U06F12E100	QFP12-48Pins
S1V30120F01A100	TQFP13-64Pins
S1V3G340F00A900	QFP13-52Pins
S2D13515F00A100	QFP22-256Pins
S2D13782F00A100	QFP15-100Pins
S2S65P10F00A000	QFP15-100Pins

Engineering Change Notice of Pure-Sn plating for QFP

Package : QFP

SEIKO EPSON Corporation

Micro Devices Operation Div.

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Please refer to following pages for detail of the change and evaluation result.

Details of engineering change

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Details of engineering change as follows,

Items	Current	New
Plating material	Sn-(1-3%)Bi	Pure-Sn

Reliability test results

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Reliability results is as follows,

Test Items	Test condition	n	Terms of Test	Failure count	Judgment
Solder ability1	Steam aging 4H→Solder dipping 245℃, 5sec	22	1 Time	0	Pass
Solder ability2	150℃,16H →Solder dipping 245℃, 5sec	22	1 Time	0	Pass
Solder ability3	-40℃～125℃ each 30 minute （After board assembly）	10	1,000 cyc.	0	Pass
Whisker test 1	Normal temp storage：30℃60%RH	22	4,000 H	0	Pass
Whisker test 2	High temp high humidity storage：60℃90%RH	22	2,000 H	0	Pass
Whisker test 3	Temp cycle：-40℃～85℃	22	1,000 cyc.	0	Pass

No defective confirmation in evaluation.

Solder ability test results　Pure-Sn plating

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■Solder ability1

Steam aging	:	4hrs
Flux dipping time	:	5～10sec
Solder temp.	:	245℃
Solder dipping time	:	5sec

■Solder ability2

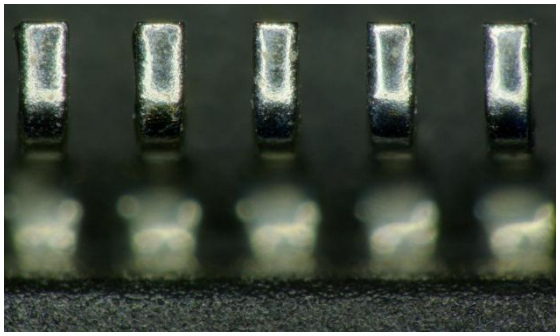
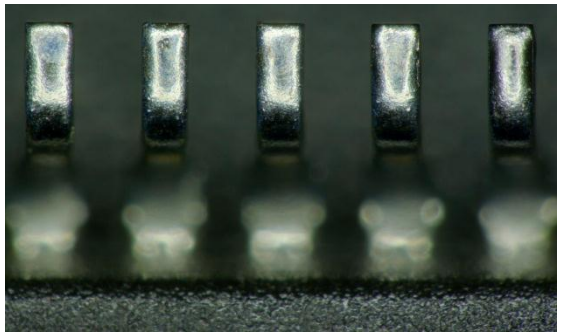
High temp. storage	:	150℃16hrs
Flux dipping time	:	5～10sec
Solder temp.	:	245℃
Solder dipping time	:	5sec

■Criteria

Solder wet rate more than 95%

■Result

Pass. All terminal solder wets rate more than 95%

	Solder ability1 Steam aging	Solder ability2 High temp storage
Photo after solder dipping		

Board assembling test result　Pure-Sn plating

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■Sample : P-LQFP048-0707-0.50（QFP12-48Pin） N=10

■Board spec.

-Dimension : 100mm × 100mm t = 1.6mm

-Material : FR-4

-Layer count : 1 layer（ One side board ）

-Cu layer : 35μm

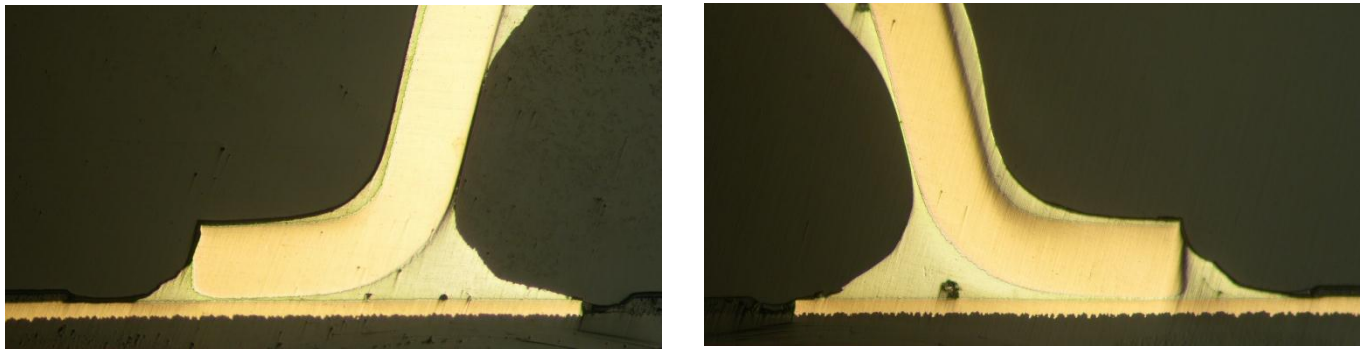
-Surface processing : Water-soluble pre-flux processing

■Solder paste : Sn-3.0Ag-0.5Cu

■Test condition : -40℃ ⇔ 125℃ （each 30 minute）

■Judgment criteria : A conduction part being left in the section part by section observation

■Test result : Pass. Because a conduction part is left in the section part after 1000cycle



＜Representative photo after 1000 cycle ＞

Whisker test result　Pure-Sn plating

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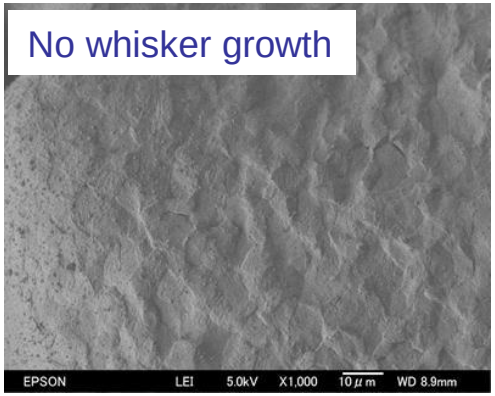
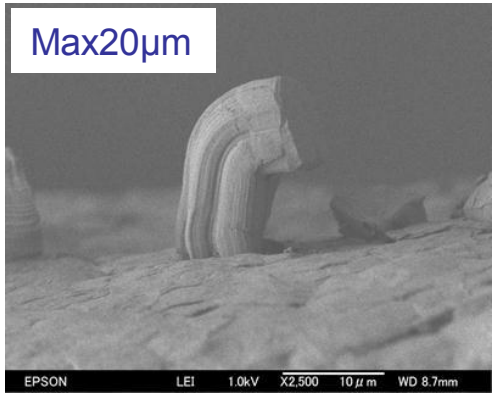
Sample : Pure-Sn plating

Test condition :
1. Normal temp. storage : 30℃60%RH, 4000 hours
2. High temp high humidity : 60℃90%RH, 2000 hours
3. Temperature cycle : -40℃～85℃, 1000 cycle

Judgment criteria : Whisker length under 50μm

Test result :
1. Normal temp. storage : Pass No whisker growth
2. High temp high humidity : Pass No whisker growth
3. Temperature cycle : Pass Under criteria

	Normal temp. 4000hrs	HT/HH 2000hrs	Temp. cycle 1000cyc
SEM photo			

Conclusion

- EPSON will change Terminal plating of QFP products, in order to unify specifications of “Pure-Sn” plating.
- Heat-resistance and Reliability level are same as current products.
- No difference of Terminal-strength and Soldering conditions.
- There is no difference in storage condition and handling conditions at customer side that is same as current products.