

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

<b>P/N</b>	<b>PKG TYPE</b>
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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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.

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

# Details of engineering change

Details of engineering change as follows,

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

# Reliability test results

Reliability results is as follows,

Test Items	Test condition	n	Terms of Test	Failure count	Judgment
Solder ability1	Steam aging 4H→Solder dipping 245°C, 5sec	22	1 Time	0	Pass
Solder ability2	150°C,16H →Solder dipping 245°C, 5sec	22	1 Time	0	Pass
Solder ability3	-40°C~125°C each 30 minute (After board assembly)	10	1,000 cyc.	0	Pass
Whisker test 1	Normal temp storage: 30°C60%RH	22	4,000 H	0	Pass
Whisker test 2	High temp high humidity storage: 60°C90%RH	22	2,000 H	0	Pass
Whisker test 3	Temp cycle: -40°C~85°C	22	1,000 cyc.	0	Pass

No defective confirmation in evaluation.

## ■ Solder ability1

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

## ■ Solder ability2

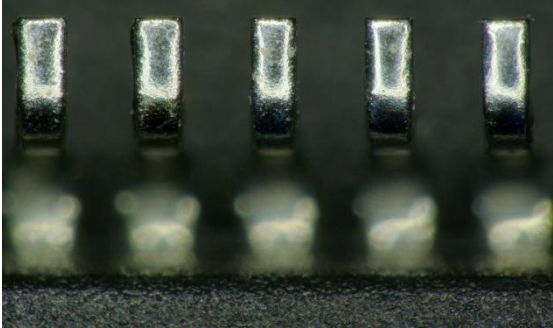
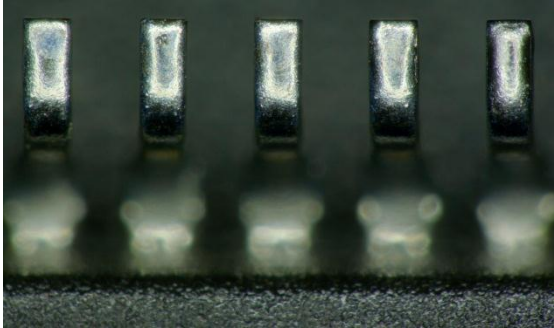
High temp. storage : 150°C 16hrs  
Flux dipping time : 5~10sec  
Solder temp. : 245°C  
Solder dipping time : 5sec

## ■ Criteria

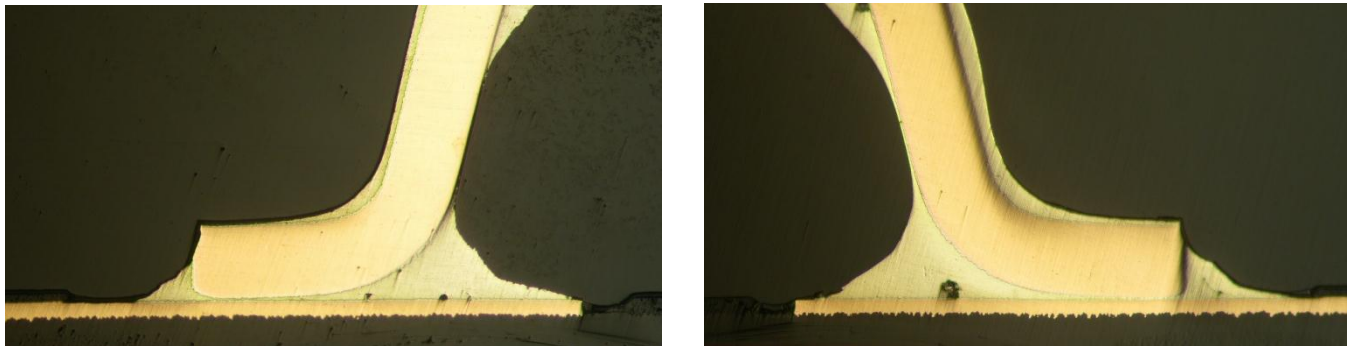
Solder wet rate more than 95%

## ■ Result

Pass. All terminal solder wets rate more than 95%

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

- 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°C ⇔ 125°C (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 >



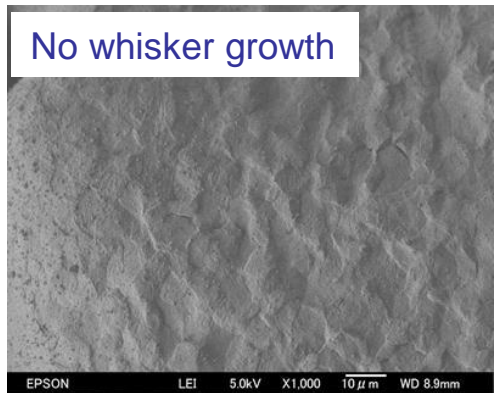

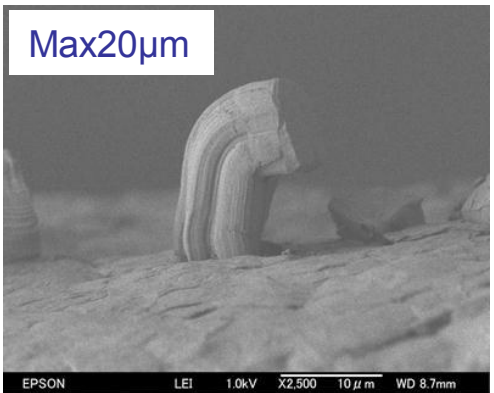
# Whisker test result Pure-Sn plating

Sample : Pure-Sn plating

Test condition : 1. Normal temp. storage : 30°C60%RH, 4000 hours  
2. High temp high humidity : 60°C90%RH, 2000 hours  
3. Temperature cycle : -40°C~85°C, 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			

- 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.