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Premstätten, July 18, 2016

PCN17-2016 (Terminal plating (Sn-Bi to Pure-Sn) and Saw type of QFN)

Dear Customer,

ams' supplier Channel Microelectronic GmbH, Alleenstrasse 29/3, 73730 Esslingen, Germany, has informed ams AG about the change of the QFN.

Affected product:

TDC-GP2 (501900001 and 501900003)

Change will be:

Terminal plating (Sn-Bi to Pure-Sn) and Saw type of QFN

Purpose of Change:

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. At the same time, package also changes to unify Saw type of QFN.

Impact on Product:

Refer to attached Appendix for details:

- Details for engineering change
- Difference of appearance image between current and new
- Difference of dimension between current and new
- Reliability results
- Result of solder ability test
- Result of board assembling test

Date of Implementation: Sep 1th, 2015

Please be advised that unless we received your written refusal concerning this PCN in writing within 30 days, the PCN shall be deemed accepted.

Attached please find IPC and drawing data. Dummy samples for mechanical setup are available upon request.

If you do have further questions, please do not hesitate to contact me.

With best regards,

Dietmar Gleispach
ams AG
Director Operations Division SSI

Engineering Change Notice of Pure-Sn plating and Saw QFN

Package：P-VQFN032-0505-0.50
(EPSON package code：QFN5)

SEIKO EPSON Corporation
Micro Devices Operation Div.

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. At the same time, package also changes to unify Saw type of QFN.

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
Package type and Appearance	Punch type of QFN - Top view ; Octagon - Side view ; Trapezoid	Saw type of QFN - Top view ; Square - Side view ; Rectangle
Mold compound	EME-G700 series	CEL9000 series
UL Flammability	UL-94 V-0	UL-94 V-0
Restricted content	Halogen free	Halogen free

- Refer to the following page about appearance and dimensions.
- We believe that there are not the change of a storage condition, a reflow profile, and a packing spec.

Appearance image

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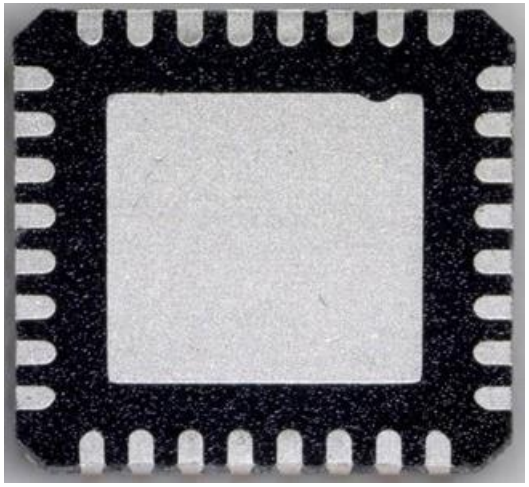
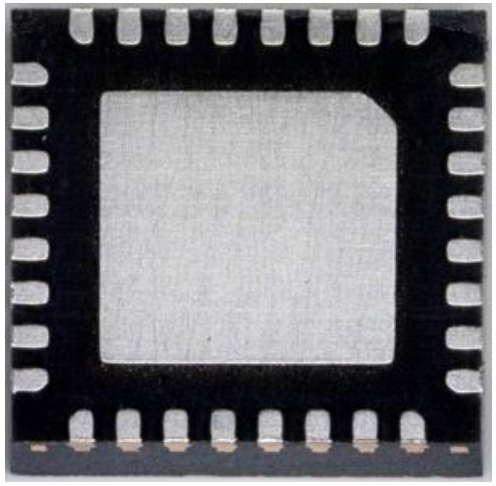
Difference of appearance image between current and new as follows,

	Current	New
Top View		
Bottom View		

Dimension （P-VQFN032-0505-0.50）

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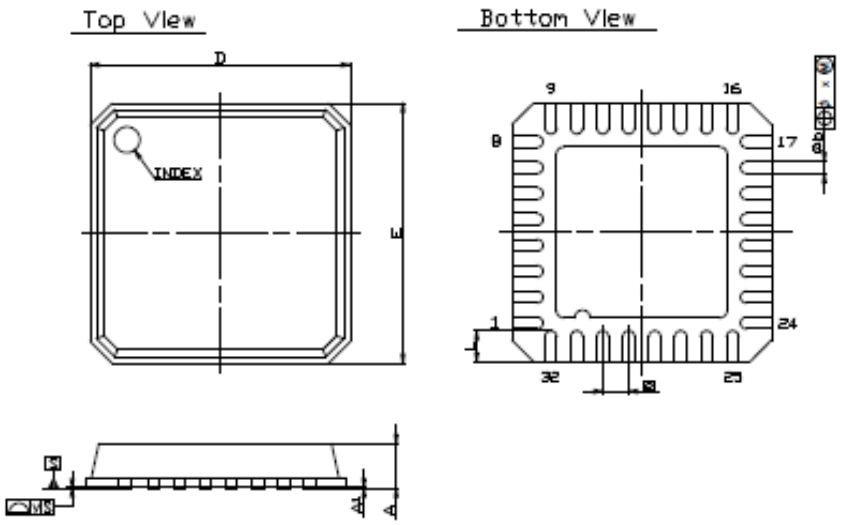
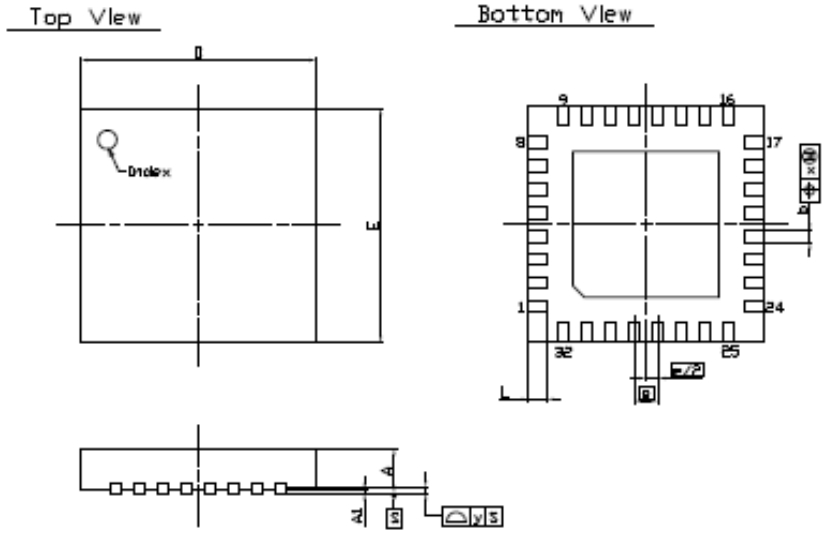
Difference of dimension between current and new as follows,

Current



Symbol	Dimension : in Millimeters		
	Min	Nom	Max
D	4.90	5.00	5.10
E	4.90	5.00	5.10
A	–	–	1.00
A_1	0.00	–	–
b	0.17	0.25	0.30
e	–	0.50	–
L	0.30	0.40	0.50
x	–	–	0.10
y	–	–	0.08

New



Symbol	Dimension : in Millimeters		
	Min	Nom	Max
D	4.90	5.00	5.10
E	4.90	5.00	5.10
A	–	–	1.00
A_1	0.00	–	–
b	0.20	0.25	0.30
e	–	0.50	–
L	0.35	0.40	0.45
x	–	–	0.10
y	–	–	0.08

Reliability Results

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Reliability results as follows,

Test Items	Test condition	n	Terms of Test	Failure count	Judgment
High Temp Bias Test	125℃, Maximum voltage	135	1,000 H	0	Pass
High Temp and High Humidity Bias Test	85℃, 85%RH	135	1,000 H	0	Pass
High Temp storage Test	Ta=150℃	45	1,000 H	0	Pass
Temp cycle Test	−65℃～150℃ each 10 minute	45	200 cyc.	0	Pass
Pressure cooker Test	Ta=121℃, 100%RH 2.0E5 Pa	45	200 H	0	Pass
Reflow Test	Moisture treatment → Reflow	45	3 Times	0	Pass
Solderbility1	Steam aging 4H→Solder dipping 245℃, 5sec	22	1 Time	0	Pass
Solderbility2	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.

Result of solder ability test　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

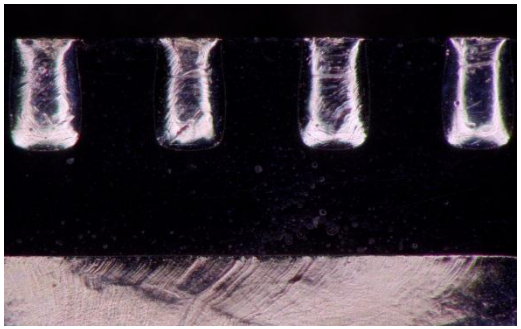
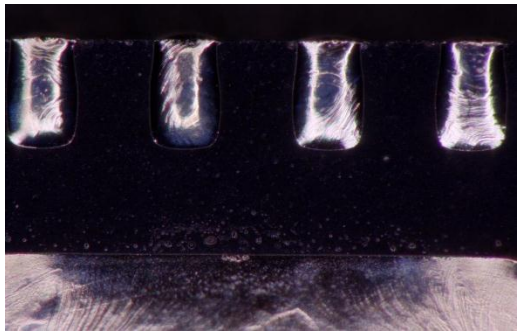
■Criteria

Solder wet rate more than 95%

■Result

Pass. All terminal solder wets rate more than 95%

※Test package : P-VQFN032-0505-0.50（SQFN5-32）

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

Result of board assembling test　Pure-Sn plating

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■Sample : P-VQFN032-0505-0.50（SQFN5-32） Daisy chain N=20

■Board spec.

-Dimension : 120mm × 30mm t = 0.8mm

-Material : FR-4

-Layer count : 4 layers (Two copper flat inner layers)

-Cu layer : 35μm

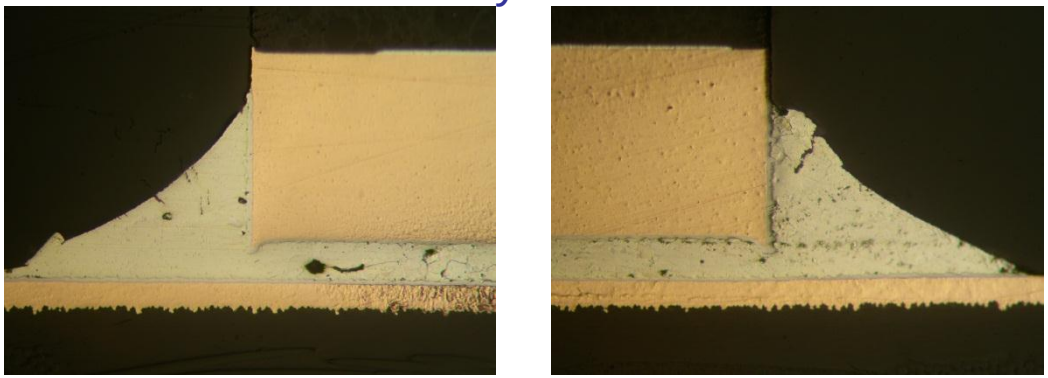
-Surface processing : Water-soluble pre-flux processing

■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 there is no over 10% resistance shift after 1000cycle.



＜Representative photo after 1000 cycle P-VQFN032-0505-0.50（SQFN5-32）＞

Conclusion

- EPSON will change Terminal plating of QFN 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.