Ref. No. 84-001e
April 7, 2006

Messrs.

Change Notice of the Plating Type for M1F Package Products

Dear Valued Customer,

We hereby inform you of the change of the plating type for the captioned devices. Please see below for the details:

<Products concerned>

1) M1F60 2) M1F60T 3) M1FE40 4) M1FS4 5) M1FS6 6) M1FL20U
7) M1FL40 8) M1FP3 9) M1F80 10) M1FM3 11) M1FH3 12) M1FJ4

<Content of Change>

The Pb free plating of electrode terminals shall be unified to Sn plating from Sn-Cu or Sn-Pb. In accordance with the unification, the spec code will be altered from 50x3 or 4063 to 60x3.

<Reason of Change>

In order to improve productivity of M1F products by unifying the Pb free plating types.

<Implementation>

The switch shall be made gradually from September, 2006. You are kindly requested to complete the switch by the end of March, 2007.

<Electrical Characteristics>

Equivalent to those of Sn-Cu dipped products.

<Reliability>

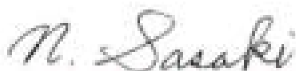
Equivalent to those of Sn-Cu dipped products.

<Evaluation of the plating>

Evaluation tests made are equivalent to those for Sn-Cu dipped products. Please see "Technical Data: Evaluation of M1F Sn Plated Products" for the details.

If you have any questions, please do not hesitate to contact us.

Shindengen Electric Mfg. Co., Ltd.



Nobuyuki Sasaki
Manager
Semiconductor Quality Assurance Dept.

Exhibit

Changes related to the transition to Sn plating

1) The spec code shall be 60x3.   (Reference: Sn-Cu dip 50x3, Sn-Pb dip 4063)
2) Marking: Two dots are marked at upper and lower positions at the tail of the date code.
(Reference: For Sn-Cu dipped products, one dot is marked at lower position)

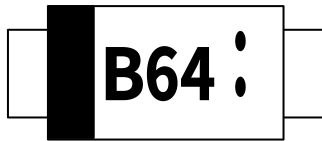


Fig-1 Marking of Sn plating

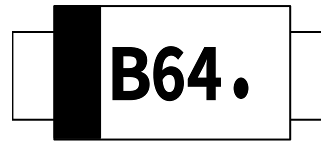


Fig-2 Marking of Sn-Cu dip
(Reference)

Technical Data

Evaluation of M1F Sn plated products

1. Solderability
2. Solder joint reliability
3. Whisker
4. Recommended soldering conditions
5. Reliability Tests

QUALITY ASSURANCE DEPT.
ELECTRIC DEVICE DIV.GROUP
SHINDENGEN ELECTRIC MFG. CO., LTD.

Revised : Apr 14, 2006

1. Evaluation of Solderability by wetting balance method

(1)Conditions

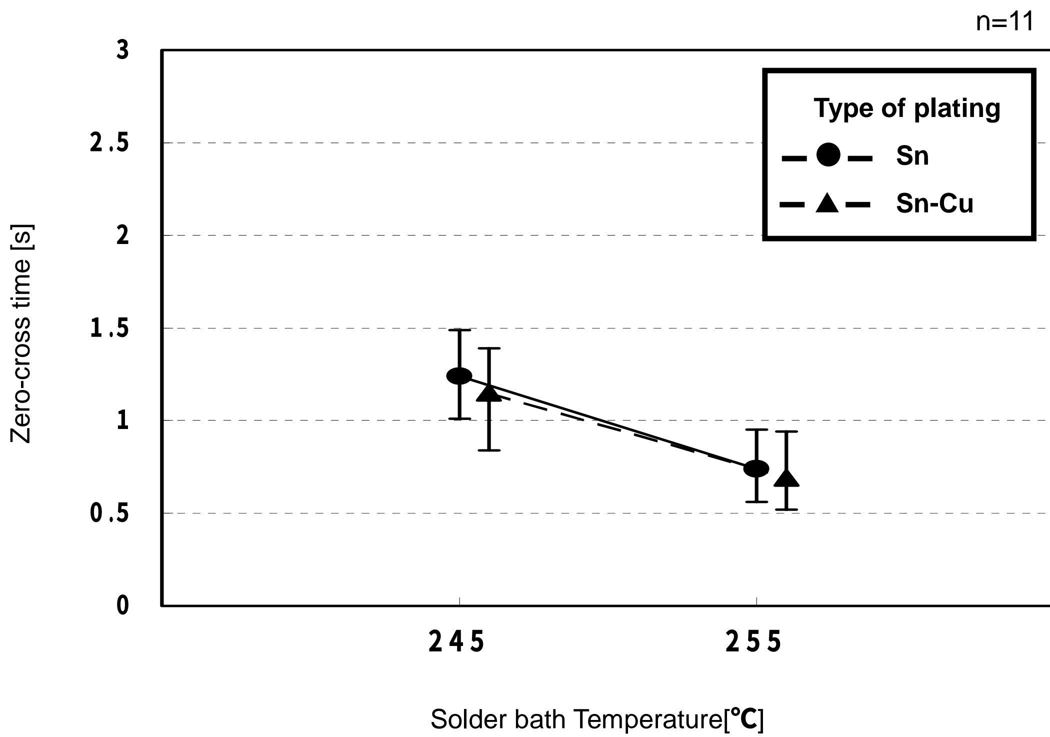
Temperature of solder bath：245℃ to 255℃　　Type of solder：Sn-3Ag-0.5Cu

Preconditioning：105℃,100%RH,8h

Testing Method：Wetting balance method (Measurement of zero-cross time)

Dipping speed：2mm/s　　Dipping depth：0.5mm

(2) Evaluation Result



Notice: Above data is a reference value in which the characteristic of a typical is shown, and no guarantee value.

2. Solder joint reliability

(1) Conditions

Type of solder: Sn-3Ag-0.5Cu

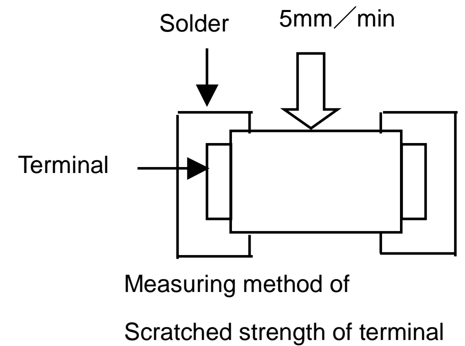
Testing substrate: FR-4,t=1.6mm thickness 35μm of copper foil

Preconditioning:105℃,100%RH,8h

Soldering conditions

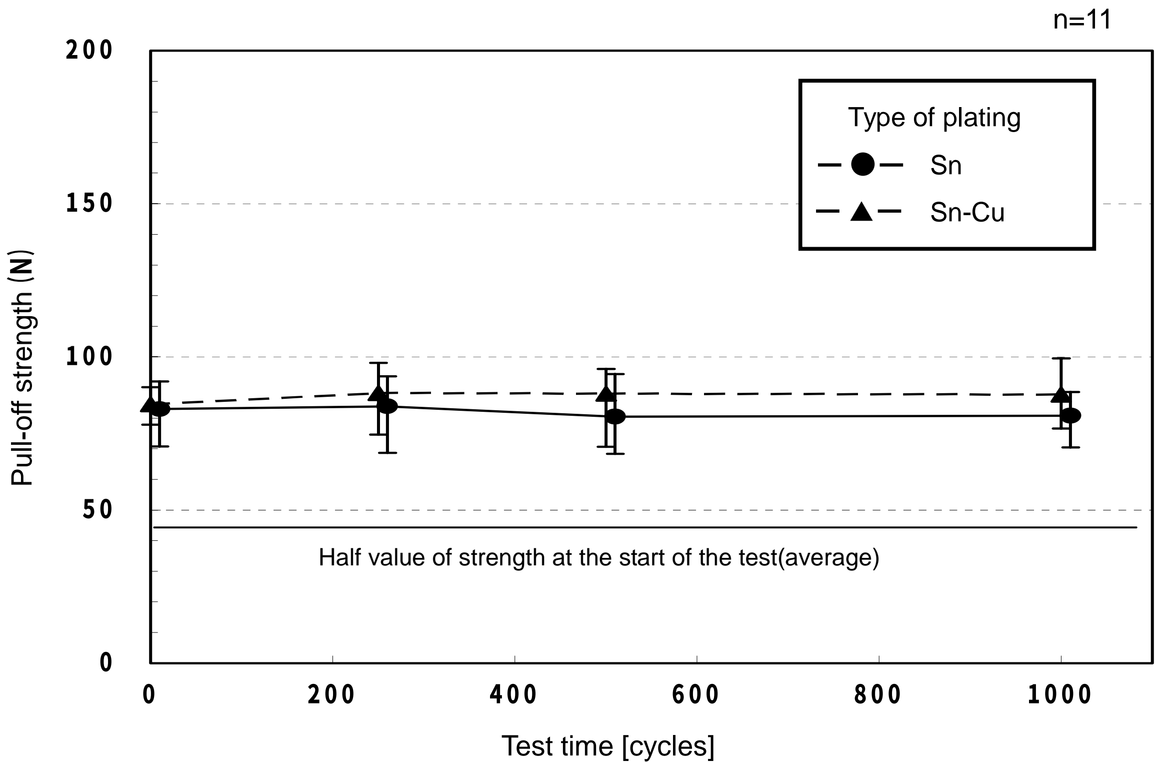
Preheating170℃ to 190℃, 130s, peak temperature 245℃

Testing method: measurement of pull-off strength of the terminal after temperature cycle test (-40℃ to 125℃)



Measuring method of Scratched strength of terminal

(2) Result



Notice: Above data is a reference value in which the characteristic of a typical is shown, and no guarantee value.

3.Whisker

(1) Condition (No.of samples:n＝5)

① Room temperature test: 2000h

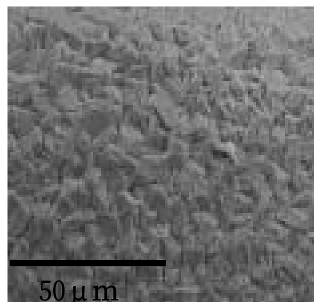
② Constant temperature/humidity test: 55℃/85%, 1000h

③ Temperature cycle test: -40℃ to 85℃, 1500cy

(2) Result

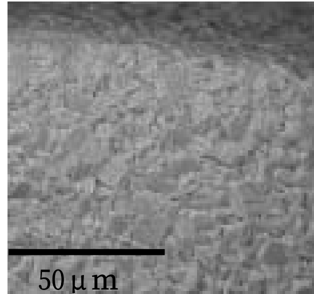
The result which observed the terminal surface by SEM is shown.

①Room temperature test: 2000h



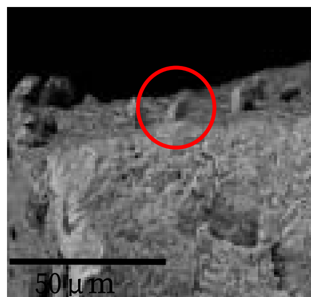
Generating of a whisker is not seen.

②Constant temperature/humidity test: 55℃/85%, 1000h



Generating of a whisker is not seen.

③Temperature cycle test: -40℃ to 85℃, 1500cy

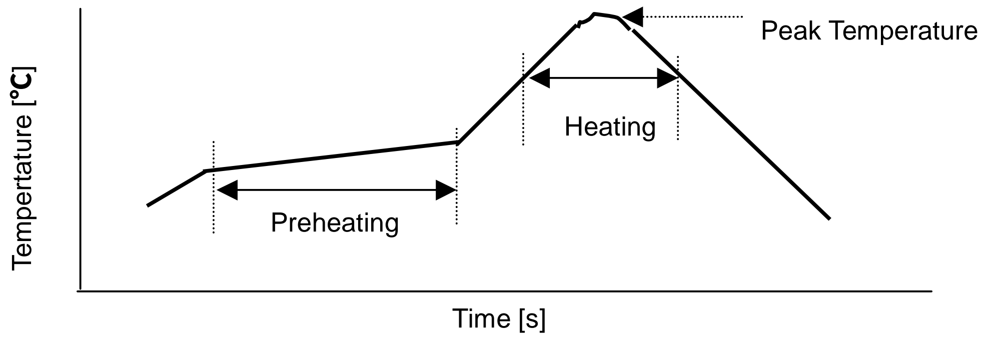


Though Whisker（inside○） of about 10μm was observed no further growth of the whisker was identified during its continued test, and there should not be a problem in actual use.

Notice: Above results of whisker evaluation of a terminal are reference data.

4.Recommended soldering conditions

4.1 Infrared-ray reflow conditions



Preheating temperature and tim	150℃ to 180℃, 90±30s
Heating temperature and time	230℃ 30±10s
Peak temperature	250℃, 10s or less Max255℃
Number of times	2

4.2 Wavesolder conditions

Solder temperature: **260±5℃**

Heating time: **10±1s**

Number of times: **1**

4.3 Hand solder conditions

Temperature of soldering iron	Heating time	Number of times
MAX 350℃	MAX 3s	1

5.Reliability tests

5.1 Resistance to soldering heat test

(1) Infrared ray reflow

Peak Temperature 250℃ MAX

Heating 230℃ 30±10s

Preheating 150～180℃ 90±30s

Number of times 2

(2) Flow

Solder temperature 260±5℃

Heating time 10s

Number of times 1

(3) Result

Infrared-ray reflow	Wavesoldering
0/22	0/22

5.2 Temperature cycle test

Test Conditions: -55℃Min 30min <-> RT 5min <-> ＋150℃Max 30min

Test time 100cy

Result

Infrared-ray reflow→Temperature c	Wavesoldering→Temperature cycle test
0/22	0/22

5.3 Moisture resistance test

Test Conditions Ta=85±2℃ RH=85±5%

Test time 1000h

Result

Infrared-ray reflow→Moisture resistance test	Wavesoldering→Moisture resistance test
0/22	0/22

Notice: Above results of temperature cycle test and moisture resistance test are reference data.