Anti-whisker formation of leadfree plating

1. Product : Transistors with leadfree plating

2.Compliance standards : JEDEC STANDARD

3. Method : JEDEC,JESD201A,JESD22A121 standard.

(1) Sample size

A minimum of 96 terminations from a minimum quantity of 3 plating lots, 2 samples from each lot per each described precondition treatments per stress test.

 * In case of big terminal component, it can be reduced a number of socket,

(2) Class level

Class 3: Mission/Life critical applications such as military and aerospace
Pure tin and high tin content alloys are not typically acceptable

Class 2: Business critical applications such as Telecom Infrastructure equipment,
High-end Servers,Automotive, etc.

Class 1: Industrial / consumer products

Class 1A: Consumer products

(3) Test procedures

Stress Type		Precondition Treatment	Total Duration	
			Class 1 and 2 Products	Class 1A Products
Temperature Cycling	−55 +0/−10 ℃ 85 +10/−0 ℃	Depend on Components	1500cyc	1000cyc
Temperature / Humidity Storage	30 ±2℃ 60 ±3% RH		4000hr	1000hr
High Temperature Humidity Storage	55 ±3℃ 85 ±3% RH		4000hr	1000hr

(4) Criteria

Component Type	Class 2	Class 1	Class 1A
2 Lead SMD Components	40 μ m for Temperature/Humidity Storage and High Temperature/Humidity Storage 45 μ m for Temperature Cycling	67μ m	50 μ m for Temperature Cycling and High Temperature/Humidity Storage 20 μ m for Temperature/Humidity
Multi-Leaded Components		67μ m	
High Frequency Components		50μ m	
Components with a minimum lead-to-lead gap >320 μ m		100μ m	75μ m

4. Whisker Test result

(1) Samples : Leadfree plating products were selected as samples.
The samples are selected for each kind of plating material,terminal material and plating method(electrical,dip)

(2) Criteria : It could be verified anti whisker or not,which is satisfied with criteria of JESD201A Class 2,1,1A.

(3) Result : It can be confirmed anti whisker which is satisfied by Class 2,1,1A as in the following next page.

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Test result (Transistor)

Package	Frame material		External lead treatment		NG Judge (pcs)
	Base material	Internal lead plating	Method	Composition ratio	
VMT3 EMT5 EMT6 WEMT6 UMT5 UMT6	FeNi42Alloy	Cu plating	Electricity plating	Sn-2Cu	0
VMT3 VMT6 EMT3F UMT3F SST3	FeNi42Alloy	Cu plating	Electricity plating	Sn	0
EMT3 UMT3 SMT3 SMT5 SMT6 SST3	FeNi42Alloy	Cu plating	Dip	Sn-3Ag-0.5Cu	0
TUMT3 TUMT5 TUMT6 TSMT8 TSST8 SOP8 MPT3 MPT6 CPT3 TCPT3 LPTS LPTL TO247	Cu	-	Electricity plating	Sn-2Cu	0
VML0806 VML1006 HUML2020 HSML3030 TO252 TO3PF SOP8 HSOP8 HSMT8 TSMT3 TSMT5 TSMT6 TSMT8 MPT3	Cu	-	Electricity plating	Sn	0
TSMT3 TSMT5 TSMT6 TO-220FM TO-220FN	Cu	-	Dip	Sn-3Ag-0.5Cu	0

Notes

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2) Before you use our Products, please contact our sales representative and verify the latest specifications :

3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.
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4) Examples of application circuits, circuit constants and any other information contained herein are provided only to illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

5) The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM or any other parties. ROHM shall have no responsibility whatsoever for any dispute arising out of the use of such technical information.

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7) The Products specified in this document are not designed to be radiation tolerant.

8) For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative : transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.

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