

Product	Transistor
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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 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 °C 85 +10/-0 °C	Depend on Components	1500cyc	1000cyc
Temperature / Humidity Storage	30 ±2°C 60 ±3% RH		4000hr	1000hr
High Temperature Humidity Storage	55 ±3°C 85 ±3% RH		4000hr	1000hr

(4) Criteria

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

4. Whisker Test result

- (1) Samples : Leadfree plating products were selected as samples.
The samples are selected for each kind of frame base material, frame base, and terminal process method and composition.
- (2) Criteria : It could be verified anti whisker or not, which is satisfied with criteria of JESD201A Class 2, 1, 1A.
- (3) Result : In existing all product transistors with leadfree plating, it can be confirmed anti whisker which is satisfied by Class 2, 1, 1A as in the following next page.

Test result (Transistor)

Frame material		External lead treatment		Judgement
Base material	Internal lead plating	Method	Composition ratio	
FeNi42Alloy	Cu plating	Electricity plating	Sn-2Cu	Pass
FeNi42Alloy	Cu plating	Electricity plating	Sn	Pass
FeNi42Alloy	Cu plating	Dip	Sn-3Ag-0.5Cu	Pass
Cu Alloy	—	Electricity plating	Sn-2Cu	Pass
Cu Alloy	—	Electricity plating	Sn	Pass
Cu Alloy	—	Dip	Sn-3Ag-0.5Cu	Pass
Cu Alloy	Ni-Pd-Au plating	Electricity plating	Sn	Pass

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