ICS 31.080.01
CCS L 40

# NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA



# GB/T 4937.3-2012

## Semiconductor devices -- Mechanical and climatic tests methods -- Part 3: External visual examination

**Issued on: November 5, 2012** **Implemented on: February 15, 2013**

**Issued by: General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China, Standardization Administration of the People's Republic of China**

# Table of Contents





## Foreword

GB/T 4937 "Mechanical and climatic test methods for semiconductor devices," consists of the following components.

--- Part 1. General;

--- Part 2. Low air pressure;

--- Part 3. External visual inspection;

--- Part 4. Steady highly accelerated damp heat test (HAST);

--- Part 5. steady state temperature humidity bias life test;

--- Part 6. high-temperature storage;

--- Part 7. Internal moisture content of the test and other residual gas analysis;

--- Part 8. Sealing;

--- Part 9. Flag durability;

--- Part 10. Mechanical shock;

--- Part 11. Rapid change of temperature double tank method;

--- Part 12. vibration frequency;

--- Part 13. salt air;

--- Part 14. firmness lead (lead strength);

--- Part 15. through-hole mount device resistance to soldering heat;

--- Part 16. Particle impact noise detection (PIND);

--- Part 17. Neutron radiation;

--- Part 18. Ionizing radiation (total dose);

--- Part 19. die shear strength;

--- Part 20. Plastic surface mount devices and moisture resistance to soldering heat;

--- Part 21. weldability;

--- Part 22. bonding strength;

--- Part 23. High temperature operating life;

--- Part 24. Accelerated moisture unbiased highly accelerated stress test;

--- Part 25. Temperature cycling;

--- Part 26. Electrostatic discharge (ESD) test of sensitivity to the human body model (HBM);

--- Part 27. Electrostatic discharge (ESD) test of sensitivity to mechanical mode (MM);

--- Part 28. Electrostatic discharge (ESD) sensitivity test device charging mode (CDM) (consideration);

--- Part 29. Test lock;

--- Part 30. Preconditioning of non-sealing surface mount devices prior to reliability testing;

--- Part 31. Flammability of plastic devices (internal cause);

--- Part 32. Flammability of plastic devices (externally induced);

--- Part 33. Accelerated moisture unbiased pressure cooking;

--- Part 34. Power cycling;

--- Part 35. Acoustic scanning plastic electronic components;

--- Part 36. constant acceleration;

--- Part 37. Hand-held electronic products drop test method using a desktop components;

--- Part 38. Soft error test method for semiconductor devices;

--- Part 39. moisture diffusivity and water dissolution rate of semiconductor components raw measurements.

This part of GB/T 34937 Part of.

This section drafted in accordance with GB/T 1.1-2009 given rules.

This section uses the translation method is equivalent to using IEC 60749-3.2002 "Semiconductor devices - Mechanical and climatic test methods - Part 3.

External visual inspection. "

For ease of use, this section made the following editorial changes.

a) instead of as a decimal by decimal comma ",". ",";

b) Remove the preface to international standards.

This part is proposed by the Ministry of Industry and Information Technology of the People's Republic of China.

This part of the National Standardization Technical Committee of the semiconductor device (SAC/TC78) centralized.

This section drafted by. China Electronics Technology Group Corporation 13th Research Institute.



## 1 Scope

GB/T 4937 the purpose of this section is to verify that a semiconductor device materials, design, construction, marking and process quality meets applicable

Requirements of the procurement documents. External visual inspection is non-destructive testing, for all package types. This test is used to identify inspection, process monitoring

Control, batch received.

## 2 Test Equipment

The device used in the test should be able to confirm whether the device meets the requirements, including the ability to zoom in 3 times to 10 times optical equipment and large enough

Field of view. For example. round magnifying glass with lighting.

## 3 program

According to the relevant specifications and detailed criterion in Chapter 4 requires the device to be checked. If the suspect device attached to foreign objects, most usable flow rate

Greatly 27m/s clean filtered air (suction or blowing) process and then check.

## 4 failure criteria

If the device is any of the following circumstances, as unqualified.

a) device design, terminals logos, marks (content, location and clarity), materials, structure and process quality does not meet the applicable procurement

Documentation requirements;

b) visible corrosion, pollution, damage (degree lead bending or breaking the seal broken,

except glass meniscus), defects (flaking, peeling

Or blistering), coating damage or expose the underlying metal (fade coating failure should not be considered unless there is peeling, pinholes or corrosion);

c) lead to misalignment or changed their normal position, shape or non-compliant or lead plus a predetermined bending. (Ribbon lead

Line) to lead a normal plane with a twist;

d) independent of sticky material such as paint or other such binding on the lead;

e) does not comply with any applicable detailed specifications or procurement documentation requirements, the lack of any of the features required to make normal or presence affect device

With obvious damage, corrosion or contamination;

f) Due to manufacturing, operation, testing or defects caused by the following factors or damage.

1) Package Package cracks or disconnection. Scratch the surface should not be considered invalid, unless these defects with this criterion as other standard methods

Chi, coatings contrary;

2) the size of the defect in any direction on the surface is greater than 1.5mm, and is deeper than the thickness of the package effective unit

25% (for example, cover, base, side walls);

3) defects in the sealing glass (not exposed to this part of the former defect) or any exposed lead frame material should not be exposed on the design of the

Exposure.