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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 4937.4-2012

**Semiconductor devices -- Mechanical and climatic test methods
-- Part 4: Damp heat, steady state, highly accelerated stress test
(HAST)**

半导体器件 机械和气候试验方法 第4部分：强加速稳态湿热试验（HAST）
(English Translation)

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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 44937 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 60749-4:2002

"Semiconductor devices - Mechanical and climatic test methods - Part 4. Strong Steady

accelerated damp heat test (HAST) ".

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

- a) instead of as a decimal by decimal comma " , " . " , " ;
- b) Remove the preface international standards;
- c) The Chapter 8 e), "See 3.1" to "see 4.2." 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

This section GB/T 4937 provides for highly accelerated damp heat steady-state test (HAST) method for evaluating the non-hermetically sealed semiconductor device Reliability in wet environments.

2 Highly accelerated damp heat steady-state test (HAST) - General Description

Highly accelerated damp heat steady state test by applying harsh temperature, humidity and bias conditions to accelerate moisture to penetrate the outer protective material (or potting Seal) or external protective material and the interface between the metal conductors. This stress test failure mechanism is usually associated with "85/85" steady state temperature humidity bias select. When two test methods perform results 85 °C/85% RH steady life test priority in highly accelerated damp heat steady state test (HAST).

This test method shall be deemed destructive testing.

3 Test Equipment

Test requires a continuously maintain the specified temperature and relative humidity, pressure vessels, while providing electrical connection to the device is applied to the test Bias conditions prescribed.

3.1 Controlled conditions

Rising to a predetermined test environment and dropped from the specified test environment, the pressure vessel should be able to provide a controlled pressure, temperature and relative humidity conditions.

3.2 Temperature Distribution

Recommended temperature record every test cycle distribution, in order to verify the validity of stress.

3.3 Test device

The device should be tested to minimize temperature gradient mounted. Test device should be placed in cabinets from the surface of at least 3cm, and should not be subjected to direct radiation heating element. Mounting plate interference devices respond steam cycle minimum.

3.4 to minimize the release of pollutants should be carefully selected and socket mounting plate material will minimize the release of pollutants, due to erosion and other degradation mechanisms caused Save to a minimum.