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

GB/T 4937.20-2018

**Semiconductor devices -- Mechanical and climatic test methods
-- Part 20: Resistance of plastic encapsulated SMDs to the
combined effect of moisture and soldering heat**

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30 ° C, 30% RH, 1 year -

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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 pressure;

--- Part 3. External visual inspection;

--- Part 4. Strongly accelerated steady-state damp heat test (HAST);

---Part 5. Steady-state temperature and humidity bias life test;

---Part 6. High temperature storage;

- Part 7. Internal water vapor content test and other residual gas analysis;
- Part 8. Sealing;
- Part 9. Logo durability;
- Part 10. Mechanical shock;
- Part 11. rapid temperature change double tank method;
- Part 12. Sweeping vibration;
- Part 13. Salt spray;
- Part 14. Terminal strength (lead robustness);
- Part 15. Resistance to soldering of through-hole mounting devices;
- Part 16. Particle collision noise detection (PIND);
- Part 17. Neutron irradiation;
- Part 18. Ionizing radiation (total dose);
- Part 19. Chip shear strength;
- Part 20. The combined effects of moisture-resistant and soldering heat on plastic surface mount devices;
- Part 20-1. Operation, packaging, marking and transport of surface mount devices sensitive to the combined effects of moisture and soldering heat;
- Part 21. Solderability;
- Part 22. Bonding strength;
- Part 23. High temperature working life;
- Part 24. Accelerated moisture-resistant and non-biased strong accelerated stress test (HSAT);
- Part 25. Temperature cycling;
- Part 26. Electrostatic discharge (ESD) sensitivity test human body model (HBM);
- Part 27. Electrostatic discharge (ESD) sensitivity test mechanical model (MM);
- Part 28. Electrostatic discharge (ESD) sensitivity test, charged device model (CDM), device level;
- Part 29. Latch test;
- Part 30. Pre-treatment of unsealed surface mount devices prior to reliability testing;
- Part 31. Flammability of plastic encapsulated devices (internal);

- Part 32. Flammability of plastic encapsulated devices (external);
- Part 33. Accelerated moisture resistance without bias high pressure cooking;
- Part 34. Power cycling;
- Part 35. Acoustic scanning microscopy of plastic electronic components;
- Part 36. Constant acceleration;
- Part 37. Plate-level drop test method using accelerometers;
- Part 38. Soft error test methods for semiconductor memory devices;
- Part 39. Measurement of moisture diffusivity and water dissolution rate of raw materials for semiconductor components;
- Part 40. Plate-level drop test method using tension meter;
- Part 41. Reliability test methods for non-volatile memory devices;
- Part 42. Storage of temperature and humidity;
- Part 43. Guide to the reliability identification scheme for integrated circuits (ICs);
- Part 44. Test method for neutron beam irradiation single particle effect of semiconductor devices.

This part is the 20th part of GB/T 4937.

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

This part uses the translation method equivalent to IEC 60749-20.2008 "Semiconductor device mechanical and climatic test methods Part 20.

Plastic surface mount devices are resistant to moisture and solder heat.

The documents of our country that have a consistent correspondence with the international documents referenced in this part are as follows.

-- GB/T 4937.3-2012 Methods of test for mechanical and climatic methods of semiconductor devices - Part 3. External visual inspection (IEC 60749-3.2002, IDT)

1 Scope

This part of GB/T 4937 specifies the soldering heat evaluation method for plastic-sealed surface mount semiconductor devices (SMD). The test is broken

Bad test.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article.

Pieces. For undated references, the latest edition (including all amendments) applies to this document.

IEC 60068-2-20.2008 Environmental testing of electric and electronic products - Part 2-20. Test methods Test T.

Weldability and solder heat resistance test method (Environmental testing-Part 2-20. Tests-Test T. Test methods for solder-

Ability and resistance to soldering heat of devices with leads)

Methods of mechanical and climatic test methods for semiconductor devices - Part 3. External visual inspection (Semiconductor devices -

Mechanical and climatic test methods-Part 3. External visual examination)

Methods of mechanical and climatic test methods for semiconductor devices - Part 35. Scanning acoustic microscopy

Mirror inspection (Semiconductor devices-Mechanical and climatic test methods-Part 35. Acoustic microscopy

For plastic encapsulated electronic components)

3 General

The welding heat test will increase the pressure of moisture in the SMD (which SMD absorbs during storage), causing the SMD plastic package to rupture.

And electrical performance is ineffective. This section simulates the moisture absorbed by SMD stored in a warehouse or dry packaging environment.

Evaluation of welding thermal performance.

4.1 Damp heat test chamber

The damp heat test chamber shall be capable of providing a temperature and relative humidity environment as specified in 5.3.

4.2 Reflow soldering equipment

The temperature profile provided by the infrared convection and gas phase reflow equipment shall be capable of complying with the welding heat conditions specified in 5.4.2 and 5.4.3. again