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

**GB/T 4937.15-2018**

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**Semiconductor devices -- Mechanical and climatic test methods  
-- Part 15: Resistance to soldering temperature for through-hole  
mounted devices**

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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 15th part of GB/T 4937.

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

This section uses the translation method equivalent to IEC 60749-15.2010 "Semiconductor device mechanical and climatic test methods Part 15.

Resistance to soldering of through-hole mounting devices.

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

GB/T 2423.28-2005 Environmental testing for electric and electronic products - Part 2. Test methods Test T. Soldering

(IEC 60068-2-20.1979, IDT).

## 1 Scope

This part of GB/T 4937 specifies the test method for solder heat resistance to ensure that the through-hole mounted solid-state packaged device is subjected to wave soldering or

The ability of a soldering iron to generate thermal stress when soldering leads.

In order to develop a standard test procedure with repeatability, a dip-welding test method with easier test conditions is selected. This program is a determiner

The ability to withstand the required soldering temperature when assembled to a board requires that the device's electrical performance be not degraded and the internal connections intact.

This test is a destructive test and can be used for identification, batch acceptance and product inspection.

This test is basically consistent with IEC 60068-2-20, but the terms of this section are used in view of the special requirements of semiconductor devices.

## 2 General

The solder heat on the back side of the board can be conducted through the leads into the device package. This section does not apply to the board on which the device body is located.

Wave soldering or reflow soldering on one side.

### 3.1 welding trough

The solder bath should be large enough to hold at least 1 kg of solder and fully immerse the leads without touching the bottom of the slot. The soldering groove should be able to

The solder was maintained at the temperature specified in Table 1.

### 3.2 dip soldering device

Table 1 Dip welding parameters

Parameter condition A (wave soldering) condition B (iron soldering)

Molten solder temperature

260+/-5 350+/-5

Immersion times  $\leq 2$   $\leq 2$

Immersion rate

Mm/s

25+/-5 25+/-5

Residence time

10+/-5 10+/-5

Proposed rate

Mm/s

25+/-5 25+/-5

Distance between solder level and device body

Mm

1.5+/-0.5 1.5+/-0.5