

JEDEC STANDARD

Test Method B106C

Resistance to Soldering Temperature for Through-Hole Mounted Devices

JESD22-B106C

(Revision of Test Method B106-B)

FEBRUARY 2005

JEDEC SOLID STATE TECHNOLOGY ASSOCIATION



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TEST METHOD B106C

**RESISTANCE TO SOLDERING TEMPERATURE FOR
THROUGH-HOLE MOUNTED DEVICES**

(From JEDEC Board Ballot JCB-98-98 and JCB-05-12, formulated under the cognizance of JC-14.1 Committee on Reliability Test Methods for Packaged Devices.)

1 Scope

This test is used to determine whether solid state devices can withstand the effects of the temperature to which they will be subjected during soldering of their leads. The heat is conducted through the leads into the device package from solder heat at the reverse side of the board. This procedure does not simulate wave soldering or reflow heat exposure on the same side of the board as the package body.

In order to establish a standard test procedure for the most reproducible methods, the solder dip method is used because of its more controllable conditions. This procedure will determine whether devices are capable of withstanding the soldering temperature encountered in printed wiring board assembly operations, without degrading their electrical characteristics or internal connections. This test is **destructive** and may be used for qualification, lot acceptance and as a product monitor.

2 Apparatus

2.1 Solder Pot

A solder pot of sufficient size to contain at least 0.91 kg (2 lbs.) of solder shall be used. Its dimensions shall allow immersion of the leads to the depth specified in 4.3 without touching the bottom of the pot. The apparatus shall be capable of maintaining the solder at the temperature specified in 4.2.

2.2 Dipping Device

A mechanical dipping device shall be used that is capable of controlling the rates of immersion and emersion of the leads and providing the dwell time specified in 4.3.

2.3 Heatsinks or shielding

If applicable, heatsinks or shielding shall be attached to the devices prior to the test and shall be as specified in the applicable procurement document.

3 Materials

3.1 Solder

The solder shall conform to JSTD-006, *Requirements for Electronic Grade Solder Alloys and Fluxed and Non-Fluxed Solid Solders for Electronic Soldering Applications*.

- SnPb alloy composition: Sn60Pb40A or Sn63Pb37A (Sn \pm 1%).
- Pb-free solder alloy composition: SN95.5Ag3.9Cu0.6, allowing variation of the Ag content between 3.0 – 4.0 wt% and Cu content between 0.5 – 1.0 wt%.
- Other lead-free alloy compositions may be used by agreement between user and supplier.

NOTE The choice of solder will not affect the test results.

4 Procedure

4.1 Special preparation of specimens

Any special preparation of the specimens prior to testing shall be as specified in the individual specification. This preparation may include operations such as bending, or other relocation of leads, and the attachment of heat sinks or protective shielding prior to solder dipping.

4.2 Preparation of the solder bath

The molten solder shall be stirred to assure that the temperature is uniform. The dross shall be skimmed from the surface of the molten solder just prior to dipping the part. The solder bath shall be maintained at a temperature of $260\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.

4.3 Solder dip

The part shall be attached to the dipping device (see 2.2) and the leads immersed in the molten solder to within 1 mm (0.04") of the body of the device under test. The immersion and emersion rates shall be $25 \pm 6\text{ mm (}1 \pm \frac{1}{4}\text{ ")}$ per second and the dwell time in the solder bath shall be $10 +2 / -0$ seconds. After the dipping process, the part shall be allowed to cool in air.

4.4 Precautions

Prior to and after the solder immersion, precautionary measures shall be taken to prevent undue exposure of the part to the heat from the solder bath. In addition, care must be taken to prevent thermal shocking the part when placed into flux removal agent.

4 Procedure (cont'd)

4.5 Measurements

Hermeticity tests for hermetic devices, visual examination, and electrical measurements, that consist of parametric and functional tests shall be made as specified in the applicable procurement document.

4.6 Failure criteria

A device shall be defined as a failure if hermeticity for hermetic devices cannot be demonstrated, if parametric limits are exceeded, or if functionality cannot be demonstrated under nominal and worst case conditions specified in the applicable procurement document. Mechanical damage such as cracking, chipping, or breaking of the package, (10 - 20X magnification), will also be considered a failure provided such damage was not induced by fixturing or handling.

5 Summary

The following details shall be specified in the applicable procurement document:

- a) The use of heatsinks or shielding, if applicable (see 2.3).
- b) Special preparation of specimens, if applicable (see 4.1).
- c) Temperature of solder bath, if other than as specified in 4.2.
- d) Time and depth of immersion, if other than as specified in 4.3.
- e) Failure criteria per 4.6 or other used.
- f) Sample size and quality level.

Annex A (informative) Differences between JESD22-B106C and JESD22-B106-B

This annex briefly describes most of the changes made to entries that appear in this standard, JESD22-B106C, compared to its predecessor, JESD22-B106-B (February 1999). If the change to a concept involves any words added or deleted (excluding deletion of accidentally repeated words), it is included. Some punctuation changes are not included.

Page	Description of change
1	Change 'Purpose' to 'Scope' to conform to the JEDEC Style Manual.
1	In 1, 2 nd paragraph, changed 'manufacturing' to 'assembly'.
1	In 2.1, added '0.91 kg' and put 2 lb in parenthetical.
2	In 3.1, reworded paragraph for clarity and added the note.
2	In 4.3, made metric unit of measurement the more dominant criteria.
2	In 4.4, Changed 'radiated by' to 'from'. Added last sentence.
3	In 5, under item e) changed 'Electrical measurements' to 'Failure Criteria per 4.6 or other used.'



Standard Improvement Form

JEDEC JESD22B106C

The purpose of this form is to provide the Technical Committees of JEDEC with input from the industry regarding usage of the subject standard. Individuals or companies are invited to submit comments to JEDEC. All comments will be collected and dispersed to the appropriate committee(s).

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1. I recommend changes to the following:

Requirement, clause number _____

Test method number _____ Clause number _____

The referenced clause number has proven to be:

Unclear Too Rigid In Error

Other _____

2. Recommendations for correction:

3. Other suggestions for document improvement:

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