IEC/PAS 62174

Edition 1.0
2000-08

Resistance to soldering temperature for through-hole mounted devices

PUBLICLY AVAILABLE SPECIFICATION

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

Reference number
IEC/PAS 62174

EIA/JEDEC STANDARD

Test Method B106-B

Resistance to Soldering Temperature for Through-Hole Mounted Devices

JESD22-B106-B

(Revision of Test Method B106-A)

FEBRUARY 1999

ELECTRONIC INDUSTRIES ALLIANCE

JEDEC Solid State Technology Association

INTERNATIONAL ELECTROTECHNICAL COMMISSION

RESISTANCE TO SOLDERING TEMPERATURE FOR THROUGH-HOLE MOUNTED DEVICES

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Engineering Department
2500 Wilson Boulevard
Arlington, VA 22201-3834

TEST METHOD B106-B

RESISTANCE TO SOLDERING TEMPERATURE FOR THROUGH-HOLE MOUNTED DEVICES

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

1 Purpose

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 manufacturing 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 2 lb of solder shall be used. Its dimensions shall allow immersion of the leads to the depth specified in paragraph 4.3 without touching the bottom of the pot. The apparatus shall be capable of maintaining the solder at the temperature specified in paragraph 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 paragraph 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 type S, composition Sn60 or Sn63, of J-STD-006, "Solders: Tin Alloy; Lead-Tin Alloy; and Lead Alloy." Other solders and their applicable bath temperatures may be used as specified in the applicable procurement document.

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 °C ± 5 °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 0.04" (1 mm) of the body of the device under test. The immersion and emersion rates shall be 1 ± ¼ " (25 ± 6 mm) 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 radiated by the solder bath.

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 Procedure (cont'd)

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) Electrical measurements.

(f) Sample size and quality level.