

JEDEC STANDARD

Lead Integrity

JESD22-B105D

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JEDEC SOLID STATE TECHNOLOGY ASSOCIATION



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TEST METHOD B105D

LEAD INTEGRITY

(From JEDEC Board Ballot JCB-11-44, formulated under the cognizance of JC-14.1 Committee on Reliability Test Methods for Packaged Devices.)

1 Scope

This test method provides various tests for determining the integrity lead/package interface and the lead itself when the lead(s) are bent due to faulty board assembly followed by rework of the part for reassembly. For hermetic packages, it is recommended that this test be followed by hermeticity tests in accordance with JESD22A109 (Test Method A109) to determine if there are any adverse effects from the stresses applied to the seals as well as to the leads. These tests, including each of its test conditions, are considered destructive and are only recommended for qualification testing. This test is applicable to all through-hole devices and surface-mount devices requiring lead forming by the user. The following is a summary of the test conditions in this standard;

a) Test Condition A - Tension

This test condition provides for the application of straight tensile loading. See clause 6.

b) Test Condition B - Bending Stress

This test condition provides for the application of bending stresses to determine the integrity of leads, seals and lead plating. See clause 7.

c) Test Condition C - Lead Fatigue

This test condition provides for the application of bending stresses primarily to determine the resistance of the leads to metal fatigue under repeated bending. See clause 8.

d) Test Condition D - Lead Torque

This test condition provides for the application of stresses to the leads to determine the resistance of seals and leads to twisting motions. See clause 9.

e) Test Condition E - Stud Torque

This test condition provides for the application of stresses on a threaded mounting stud caused by tightening the device during mounting. See clause 10.

2 Normative reference

JESD22-A109, *Hermeticity*.

3 Apparatus

See applicable test condition.

4 General procedure applicable to all test conditions

The device shall be subjected to the stress described in the specified test condition and the specified end point measurements and inspections shall be made except for initial conditioning unless otherwise specified. When possible, the stress shall be applied to randomly selected leads from each device. The same leads shall not be used for more than one test condition.

5 General summary

The following details, and those required by the specific test condition, shall be specified in the applicable procurement document:

- a) Test Condition Letter
- b) Sample size (combinations of number of leads per device and number of devices) and quality level.
The sample size shall not consist of less than 3 devices

6 Test Condition A - Tension

6.1 Purpose

This test is designed to check the capabilities of the device, leads, welds, and seals to withstand a straight pull.

6.2 Apparatus

The tension test requires suitable clamps and fixtures for securing the device and attaching the specified weight without lead restriction. Equivalent linear pull test equipment may be used.

6.3 Procedure

A tension of 8.0 ± 0.5 oz (227 ± 14 gram) shall be applied without shock to each lead to be tested in a direction parallel to the axis of the lead or terminal and the tension shall be maintained for 30 seconds minimum. The tension shall be applied as close to the end of the lead as practicable.

6.3 Procedure (cont'd)

6.3.1 Measurements

Hermeticity test on hermetically sealed packages, visual examination, and electrical measurements that consist of parametric and functional tests, shall be taken as specified in the applicable procurement document.

6.3.2 Failure criteria

After the removal of the stress, examine the device using a magnification between 10X and 20X. Any evidence of breakage, loosening, or relative motion between the lead and the device body shall be considered a device failure. When hermeticity tests are conducted (in accordance with Test Method A109) as a post measurement, meniscus cracks shall not be a cause for rejection of the devices, which have passed the tests. Failure of any specified post electrical measurement shall be considered a cause for failure.

6.4 Summary

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

- a) Weight to be attached to lead, if other than 8.0 ± 0.5 oz (227 ± 14 gram).
- b) Length of time weight is to be attached, if other than 30 seconds.
- c) Failure criteria, if other than specified.

7 Test Condition B - Bending Stress

7.1 Purpose

This test is designed to check the capability of the leads, lead finish, lead welds and seals of the devices to withstand stresses to the leads and seals which might reasonably be expected to occur from actual handling and assembly of the devices in application.

7.2 Apparatus

The bending test requires attaching devices, clamps, supports or other suitable hardware, necessary to apply the bending stress through the specified bend angle.