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Semiconductor devices - Mechanical and climatic test methods - Part 22-2: Bond strength - Wire bond shear test methods

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IEC 60749-22-2 has been prepared by IEC technical committee 47: Semiconductor devices. It is an International Standard.

This International Standard is to be used in conjunction with IEC 60749-22-1:2025.

This first edition, together with the first edition of IEC 60749-22-1, cancels and replaces the first edition IEC 60749-22 published in 2002. It is based on JEDEC document JESD22-B120. It is used with permission of the copyright holder, JEDEC Solid State Technology Association.

This edition includes the following significant technical changes with respect to the previous edition:

a) Major update, including new techniques and use of new materials (e.g. copper wire) involving a complete rewrite as two separate subparts (this document and IEC 60749-22-1).

The text of this International Standard is based on the following documents:

Draft	Report on voting
47/2959/FDIS	47/2981/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 60749 series, published under the general title *Semiconductor devices - Mechanical and climatic test methods*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

– reconfirmed,

– withdrawn, or

– revised.

1 Scope

This part of IEC 60749 establishes a means for determining the strength of a ball bond to a die or package bonding surface and can be performed on pre-encapsulation or post-encapsulation devices. This measure of bond strength is extremely important in determining two features:

a) the integrity of the metallurgical bond which has been formed, and

b) the quality of ball bonds to die or package bonding surfaces.

This test method covers thermosonic (ball) bonds made with small diameter wire from 15 µm to 76 µm (0,000 6" to 0,003").

This test method can only be used when the bonds are large enough to allow for proper contact with the shear test chisel and when there are no adjacent interfering structures that would hinder the movement of the chisel. For consistent shear results the ball height will be at least 4,0 µm (0,000 6 ") for ball bonds, which is the current state of the art for bond shear test equipment at the time of this revision.

This test method can also be used on ball bonds that have had their wire removed and on to which a second bond wire (typically a stitch bond) is placed. This is known as "stitch on ball" and "reverse bonding". See Annex A for additional information.

The wire bond shear test is destructive. It is appropriate for use in process development, process control, or quality assurance, or both.

This test method can be used on ultrasonic (wedge) bonds, however its use has not been shown to be a consistent indicator of bond integrity. See Annex B for information on performing shear testing on wedge bonds.

This test method does not include bond strength testing using wire bond pull testing. Wire bond pull testing is described in IEC 60749-22-1.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60749-22-1, *Semiconductor devices - Mechanical and climatic test methods - Part 22-1: Bond strength testing - Wire bond pull test methods*