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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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CONTENTS

FOREWORD 4
1 Scope 6
2 Normative references 6
3 Terms and definitions 6
3.1 Terms and defintions 7
3.2 Terms and definitions applicable to Annex B 8
4 Apparatus and material required 8
4.1 Inspection equipment 8
4.2 Measurement equipment 8
4.3 Workholder 9
4.4 Bond shear equipment 9
4.5 Bond shear chisel tool setup 9
5 Procedure 9
5.1 Calibration 9
5.2 Visual examination of bonds to be tested after decapsulation 10
5.2.1 Usage of visual examination 10
5.2.2 Bond pad examination and acceptability criteria for both Al and Cu bond pad metallization 10
5.2.3 Copper bond and Cu wire examination and acceptability criteria 10
5.3 Measurement of the ball bond diameter to determine the ball bond shear failure criteria 10
5.4 Performing the bond shear test 11
5.5 Examination of sheared bonds 12
5.6 Bond shear codes for ball bonds 12
5.6.1 General 12
5.6.2 Type 1 – Bond lift 16
5.6.3 Type 2 – Bond shear 17
5.6.4 Type 3 – Cratering 19
5.6.5 Type 4 – arm contacts specimen (bonding surface contact) 21
5.6.6 Type 5 – shearing skip 21
5.6.7 Type 6 – Bond pad (or bonding surface) lift 21
5.7 Bond shear data 22
6 Summary 22
Annex A (informative) Performing this test method on "stitch on ball" bonds 23
Annex B (informative) Performing this test method on ultrasonic wedge bonds 25
B.1 General 25
B.2 Additions and modifications of the main text 25
B.2.1 Addition to Clause 1 25
B.2.2 Addition to Clause 3 25
B.2.3 Replacement of 4.4 25
B.2.4 Replacement of 5.4 26
B.2.5 Replacement of 5.5 26
B.2.6 Additional text to 5.6 26
B.2.7 Replacement of Clause 6 26
Annex C (informative) Performing shear testing when a tool cannot reach below bond centreline 27

Annex D (informative) Concerns with decapsulation processes for devices with copper wirebonds 29
Annex E (informative) Bond contact area – Valid method for comparing shear force 32
Bibliography 34

Figure 1 – Bond shear set-up for bond on die bonding pad 7
Figure 2 – Proper height placement of shear tool with respect to ball centre line 9
Figure 3 – Ball bond measurement: side view and top view (for symmetrical versus asymmetrical) 11
Figure 4 – Type 1: Bond lift – Gold aluminium 12
Figure 5 – Type 1: Bond lift – Copper/aluminium, copper/copper and gold/gold 12
Figure 6 – Type 1: Bond lift – All metal systems on leadframe or substrate 13
Figure 7 – Type 2: Bond shear – All metal systems – Variation A – Separation within bonding surface metalization 13
Figure 8 – Type 2: Bond shear – Gold/aluminium – Variation B – Separation wholly within intermetallic layer 13
Figure 9 – Type 2: Bond shear – All metal systems and surfaces, except Gold/aluminium – Variation B – Separation at bonding surface 14
Figure 10 – Type 2: Bond shear – All metal systems and bonding surfaces – Variation C – Separation at material interface and within bulk material 14
Figure 11 – Type 2: Bond shear – All metal systems – Variation D – Separation within ball bond 14
Figure 12 – Type 2: Bond shear – All metal systems on leadframe or substrate – Variation D – Separation within ball bond 15
Figure 13 – Type 3: Cratering 15
Figure 14 – Type 4: Bonding surface contact 15
Figure 15 – Type 5: Shearing skip 16
Figure 16 – Type 6: Bonding pad surface lift 16
Figure 17 – Type 6: Leadframe or substrate bond pad or bonding surface metalization lift 16
Figure 18 – Imprints on Al pad from lifted bonds with no evidence of shearing (Type 1) 17
Figure 19 – Shear of aluminium pad (with copper wire) (Type 2 – Variation A) 18
Figure 20 – Shear wholly within gold/aluminium intermetallic layer (Type 2 – Variation B) 18
Figure 21 – Shear in bulk copper ball bond and at material interface (Type 2 – Variation C) 19
Figure 22 – Shear wholly within gold ball bond (Type 2 – Variation D) 19
Figure 23 – Shear wholly within Cu ball bond (Type 2 – Variation D) 19
Figure 24 – Bond pad cratering after shear test 20
Figure 25 – Bond pad cratering (pad and ball view) and validation of crack and thin Al on another pad 20
Figure 26 – Images of shear tool contacting the bonding surface (shear tool set too low) 21
Figure 27 – Images of shearing skip (shear tool set too high) 21
Figure 28 – Images of bonding surface lifting 22
Figure A.1 – Top view of "stitch on ball" bond 23
Figure A.2 – Side view of "stitch on ball" bond 23

Figure A.3 – Die to die bonding 24
Figure A.4 – "Reverse" bond, with ball on leadframe 24
Figure C.1 – Passivation preventing proper height placement of shear tool 27
Figure C.2 – Remnant due to shear tool placement above centreline 27
Figure C.3 – Views of excessive Al splash 28
Figure D.1 – Images of copper ball bonds showing severe damage from etching process 29
Figure D.2 – Comparison images showing degree of Cu attack due to two different etchants 29
Figure D.3 – Stitch bond after decapsulation using laser ablation 30
Figure D.4 – Die and wirebonds decapsulated using laser ablation 31
Figure E.1 – Sample cross section of a copper wire bond 32
Figure E.2 – Image analysis of pixel distribution within the fitted circle (represents ball) 33
Figure E.3 – Images of "optical versus SEM" correlation study 33

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

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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*