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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Semiconductor devices-Micro-electromechanical devices -
Bend-and shear-type test methods of measuring adhesive
strength for MEMS structures**

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foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1. Structure and Drafting Rules of Standardization Documents" drafted.

This document is identical to IEC 62047-13:2012 "Semiconductor Devices Microelectromechanical Devices Part 13. MEMS Structural Bonding Flexural and shear test methods for additional strength".

The following minimal editorial changes have been made to this document.

a) In order to harmonize with the existing standards, the name of the standard is changed to "Bend of Bonding Strength of Semiconductor Devices, Micro-Electro-Mechanical Devices, MEMS Structures".

Curve and Shear Test Methods";

b) Added the explanation of "lc" and "D" in formula (1);

c) Added the description of the index symbols for the diagrams in Appendix A.

Please note that some content of this document may be patented. The issuing agency of this document assumes no responsibility for identifying patents.

1 Scope

This document specifies a test method for measuring the bond strength between microscale elements and substrates using cylindrical specimens. This document applies to substrates

The upper width and thickness of the microstructures between 1 μm and 1 mm were tested for bonding strength.

The micro-sized unit of MEMS device is a laminated fine film produced on the substrate by deposition, electroplating, gluing, photolithography and other processes.

composed of graphics. MEMS devices contain a large number of interfaces between dissimilar materials that occasionally decompose during fabrication or use.

Floor. Material cohesion at the bonding interface determines the bond strength, in addition, defects and residual stresses near the interface vary with process conditions

The change greatly affects the bond strength. This document specifies the bond strength test method for micro-scale elements to facilitate the optimization of MEMS devices.

material and process conditions.

Due to the wide range of materials and sizes that make up MEMS devices, instruments for measuring micro-scale units have not been fully promoted.

This document does not impose specific restrictions on the materials, dimensions and properties of the test specimens.

2 Normative references

The contents of the following documents constitute essential provisions of this document through normative references in the text. Among them, dated citations

documents, only the version corresponding to that date applies to this document; for undated references, the latest edition (including all amendments) applies to this document.

IEC 62047-2.2006 Semiconductor devices Microelectromechanical devices Part 2.Tensile test methods for thin film materials (Semicon-als)

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1

Bending bond strength adhesivebendstrength

Nominal strength of bonded area in bending mode.

3.2

The nominal strength of the bond area in shear mode.

4.1 General

This document specifies the test method for the bond strength between a cylindrical specimen (see Figure 1) and a substrate. Apply displacement or stress at constant velocity

On the columnar specimen, the stress at the delamination interface was measured to analyze the bond strength between the columnar specimen and the substrate. with tapered tip