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

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**Micro-electromechanical systems(MEMS) technology - Bulge
test method for measuring mechanical properties of thin films**

微机电系统（MEMS）技术 薄膜力学性能的鼓胀试验方法

(English Translation)

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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 for standardization documents" Drafting is required.

This document is equivalent to IEC 62047-17:2015 "Semiconductor devices - Microelectromechanical devices - Part 17: Determination of mechanical properties of thin films" "Test Methods".

The following minimal editorial changes were made to this document.

In order to coordinate with the existing standards, the name of the standard was changed to "Micro-electromechanical systems (MEMS) technology - Bulging test of mechanical properties of thin films" method";

Corrected a typographical error in the International Standard by changing the reference to "Annex B" in 6.1 to "Annex C". -

1 Scope

This document describes the bulge test method for window films. Specimens are made from micro/nanostructured thin film materials including metals, ceramics, and Polymer films are used in micro-electromechanical systems (MEMS), micro-machines and other fields. The film thickness ranges from 0.1 μm to 10 μm . Square the width of the rectangular window ranges from 0.5 mm to 4 mm, and the diameter of the circular window ranges from 0.5 mm to 4 mm.

This document is applicable to elastic modulus and residual stress testing of window film samples under normal temperature conditions by applying uniform pressure to them.

2 Normative references

The contents of the following documents constitute the essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies.

in this document.

IEC 62047-2:2006 Semiconductor devices Micro-electromechanical devices Part 2: Tensile test methods for thin film materials (Semiconductor devices-Micro-electromechanical devices-Part 2: Tensile testing method of thin film materials)

3.1 Terms and Definitions

The following terms and definitions apply to this document.

3.1.1

residual stress

σ_0

The stress that exists in a specimen in the absence of external loads.

3.1.2

Biaxial modulus

Elastic modulus under plane strain conditions.

3.1.3

Window film membrane window the tested area of the thin film specimen without supporting structure which is in direct contact with the pressurized medium.

Note: See Figure 1.