

ICS 31.200
CCS L 55



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

GB/T 42709.22-2026

**Semiconductor devices - Micro-electromechanical devices -
Part 22: Electromechanical tensile test method for conductive
thin films on flexible substrates**

半导体器件 微电子机械器件 第22部分：柔性衬底导电薄膜机电拉伸测试方法
(English Translation)

Issued on: July 30, 2026

Implemented on: February 1, 2027

Issued by: State Administration for Market Regulation

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is Part 22 of GB/T 42709 "Semiconductor Devices - Microelectromechanical Devices". GB/T 42709 has been published as follows.

Part 2.

- Part 2: Tensile Testing Methods for Thin Film Materials;
- Part 3: Standard test pieces for tensile testing of thin films;
- Part 5: Radio Frequency MEMS Switches;
- Part 6: Axial fatigue testing methods for thin film materials;
- Part 7: MEMS Bulk Acoustic Filters and Duplexers for RF Control and Selection;

---Part 12: Bending fatigue testing method for thin film materials using MEMS structural resonance method;

---Part 19: Electronic Compass;

---Part 21: Methods for Measuring Poisson's Ratio in MEMS Thin Film Materials;

---Part 22: Electromechanical Tensile Testing Methods for Conductive Thin Films on Flexible Substrates;

---Part 29: Electromechanical relaxation test methods for suspended conductive films at room temperature;

---Part 35: Methods for testing the electrical properties of flexible MEMS devices under bending deformation;

---Part 36: Environmental and Dielectric Permeability Testing Methods for MEMS Piezoelectric Thin Films;

---Part 38: Test Method for Adhesion Strength of Metal Powder Paste in MEMS Interconnects;

---Part 40: Threshold testing method for MEMS inertial shock switches.

This document is equivalent to IEC 62047-22:2014 "Semiconductor devices - Microelectromechanical devices - Part 22: Conductive thin films on flexible substrates".

Membrane electromechanical tensile testing method.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the Ministry of Industry and Information Technology of the People's Republic of China.

This document was prepared by the National Integrated Circuit Standardization Technical Committee (SAC/TC599) and the National Microelectromechanical Technology Standardization Technical Committee.

(SAC/TC336) are jointly under the jurisdiction of the State Administration of Taxation.

Introduction

---Part 2: Tensile Testing Methods for Thin Film Materials. The purpose is to specify tensile testing methods for MEMS thin film materials.

---Part 3: Standard Test Pieces for Tensile Testing of Thin Films. The purpose is to specify the test pieces for tensile testing of MEMS thin film materials.

Relevant requirements.

---Part 5: Radio Frequency MEMS Switches. The purpose is to define the terminology and definitions, characteristic requirements, and testing procedures for radio frequency MEMS switches.

Methods, etc.

---Part 6: Axial Fatigue Testing Methods for Thin Film Materials. The purpose is to specify axial fatigue testing methods for MEMS thin film materials.

method.

---Part 7: MEMS Bulk Acoustic Filters and Duplexers for RF Control and Selection. The purpose is to specify MEMS bulk acoustic filters and duplexers.

Terminology and definitions, characteristic requirements, and test methods for acoustic resonators, filters, and duplexers.

---Part 8: Bending Test Method for Measuring the Tensile Properties of Strip Films. The purpose is to specify the method for measuring the tensile properties of strip films.

A bending test method for sexuality.

---Part 9: Measurement of inter-wafer bonding strength. The purpose is to specify the testing methods for the bonding strength of MEMS wafers.

---Part 11: Test method for the linear thermal expansion coefficient of materials in suspended microelectromechanical systems. The purpose is to specify the linear thermal expansion coefficient of materials in suspended microelectromechanical systems.

Method for testing the linear thermal expansion coefficient of MEMS materials.

---Part 12: Bending Fatigue Testing Method for Thin Film Materials Using MEMS Structural Resonance. The purpose is to specify the testing methods for MEMS thin film materials.

Methods for testing the bending fatigue of membrane materials.

---Part 13: Bending and Shear Test Methods for Bond Strength of MEMS Structures. The purpose is to specify the bonding strength of MEMS structures.

Strength test method.

---Part 16: Test methods for wafer curvature and cantilever beam deflection of residual stress in MEMS films. The purpose is to specify the methods for measuring the residual stress in MEMS films.

---Part 19: Electronic Compass. The purpose is to define the terminology and definitions, characteristic requirements, and test methods for electronic compasses.

---Part 21: Methods for Measuring Poisson's Ratio of MEMS Thin Film Materials. The purpose is to specify methods for measuring the Poisson's ratio of MEMS thin film

materials.

method.

---Part 22: Electromechanical Tensile Testing Methods for Conductive Thin Films on Flexible Substrates. The purpose is to specify the electromechanical tensile testing methods for conductive thin film materials in MEMS.

Electrical property tensile testing method.

---Part 26: Description and Test Methods for Microgrooves and Needle Structures. The purpose is to specify the description and test methods for MEMS microgrooves and needle structures.

Description and experimental methods.

---Part 27: Miniature V-T Test (MCT) Method for Measuring Glass Slurry Bond Strength. The purpose is to specify the glass fusion bond strength.

The MCT test method for the bond strength of the structure.

---Part 29: Electromechanical Relaxation Test Methods for Suspended Conductive Thin Films at Room Temperature. The purpose is to specify the electromechanical relaxation test methods for suspended conductive thin films in MEMS devices.

Electromechanical relaxation test method for thin films at room temperature.

---Part 32: Nonlinear Vibration Testing Methods for MEMS Resonators. The purpose is to define the nonlinear vibration characteristics of MEMS resonators.

Performance testing methods.

---Part 35: Test methods for electrical properties of flexible MEMS devices under bending deformation. The purpose is to specify the electrical properties of flexible electromechanical devices...

Methods for testing electrical properties under bending deformation.

---Part 36: Environmental and Dielectric Permeability Testing Methods for MEMS Piezoelectric Thin Films. The purpose is to specify the environmental and dielectric withstand voltage testing methods for MEMS piezoelectric thin films.

Environmental and dielectric withstand performance test methods.

---Part 38: Test Method for Adhesion Strength of Metal Powder Paste in MEMS Interconnects. The purpose is to specify the adhesion strength of metal powder paste in MEMS interconnects.

This is a test method for the adhesion strength of powders and pastes.

Test method.