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

GB/T 42709.40-2026

**Semiconductor devices - Micro-electromechanical devices -
Part 40: Test methods of MEMS inertial shock switch threshold**

半导体器件 微电子机械器件 第40部分：MEMS惯性冲击开关阈值测试方法
(English Translation)

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Foreword

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This document conforms to GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting is scheduled.

This document is Part 40 of GB/T 42709 "Semiconductor Devices - Microelectromechanical Devices". GB/T 42709 has been published.

The following section.

- 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 8: Bending test method for measuring the tensile properties of strip films;
- 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 29: Electromechanical relaxation test method for suspended conductive films at room temperature;
- Part 35: Test methods for electrical properties of flexible MEMS devices under bending deformation;
- Part 36: Environmental and dielectric withstand voltage testing methods for MEMS piezoelectric thin films;
- Part 38: Test method for adhesion strength of metal powder paste in MEMS interconnects;
- Part 40: MEMS inertial shock switch threshold test method.

This document is equivalent to IEC 62047-40:2021 "Semiconductor devices -

Microelectromechanical devices - Part 40: MEMS - Inertial impulses".

"Threshold test method for trigger switch".

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

- a) Add an introductory phrase before the item descriptions;
- b) In terms and definitions, explanatory statements about terms are placed in "notes".

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/TC 599) and the National Microelectromechanical Technology Standardization Technical Committee.

(SAC/TC 336) jointly under the jurisdiction of the State Administration of Taxation.

Introduction

MEMS inertial impact switches can sense external acceleration. When the acceleration reaches the switch's threshold, the switch closes or opens. They are widely used.

It is planned to consist of 23 parts.

--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 test pieces for tensile testing of MEMS thin film materials.

The relevant requirements.

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

Methods, etc.

--Part 6: Axial Fatigue Testing Methods for Thin Film Materials. The purpose is to specify the 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, 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: Wafer Bond Strength Measurement. The purpose is to specify the testing methods for the bond strength of MEMS wafers.

--Part 11: Methods for testing the linear thermal expansion coefficient of materials for suspended microelectromechanical systems. The aim is to specify the linear thermal expansion coefficient for suspended MEMS.

Methods for testing the linear thermal expansion coefficient of materials.

--Part 12: Bending fatigue testing method for thin film materials using MEMS structural resonance. The purpose is to specify the MEMS...

Methods for testing the bending fatigue of thin film materials.

--Part 13: Bending and Shear Testing Methods for the Adhesion Strength of MEMS Structures. The purpose is to specify the adhesion strength of MEMS structures.

Attached is the strength test method.

Two test methods were used. wafer curvature and cantilever beam deflection for residual membrane stress.

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

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

Try different methods.

--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 Measurement Methods for Microtrench and Needle Structures. The purpose is to specify the description and measurement methods for MEMS microtrench and needle structures.

Description and experimental methods.

--Part 27: Miniature V-T Test (MCT) Method for Measuring the Bond Strength of Glass

Slurry. The purpose is to specify the bonding strength of glass slurry...

The MCT test method for composite strength.

--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 specify the nonlinear vibration testing methods for MEMS resonators.

Dynamic 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 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.

--Part 40: Threshold Test Methods for MEMS Inertial Shock Switches. The purpose is to specify the threshold values for MEMS inertial shock switches.

Value testing method.

--Part 44: Methods for testing the dynamic characteristics of MEMS resonant electric field-sensitive devices. The purpose is to specify methods for evaluating and determining...

Terminology, definitions, and testing methods for the dynamic performance of MEMS resonant electric field sensitive devices.

Semiconductor devices and microelectromechanical devices Part 40: MEMS Inertial Shock Switch Threshold Test methods

1 Scope

This document describes the test conditions and test methods for the threshold of MEMS inertial shock switches.