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**NATIONAL STANDARD OF THE
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**Semiconductor devices - Micro-electromechanical devices -
Part 19: Electronic compasses
(English Translation)**

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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 19 of GB/T 42709 "Semiconductor Devices Microelectronic Mechanical Devices". GB/T 42709 has been released with Lower part.

---Part 5: RF MEMS switches;

---Part 7: MEMS bulk acoustic wave filters and duplexers for RF control and selection;

---Part 19: Electronic compass.

This document is equivalent to IEC 62047-19:2013 "Semiconductor Devices Microelectromechanical Devices Part 19: Electronic Compass".

This document has made the following minimal editorial changes.

---For ease of understanding, two footnotes have been added to Table 1.

Please note that some content in this document may be subject to patents. The publisher of this document assumes no responsibility for identifying patents.

Introduction

This document is applicable to electronic compasses and clarifies the terms, definitions, basic ratings and characteristics of electronic compasses, as well as test methods, etc., which is beneficial to better guide relevant industry practitioners in product development, testing, use, etc. GB/T 42709 "Semiconductor Device Microelectronics "Mechanical Devices" is intended to consist of the following parts.

---Part 2: Tensile test methods for film materials. The purpose is to specify the tensile test method for MEMS thin film materials.

---Part 3: Film standard test pieces for tensile testing. The purpose is to specify test pieces for tensile testing of MEMS film materials related requirements.

---Part 5: RF MEMS switches. The purpose is to specify the terminology definitions, characteristic requirements, and test methods of radio frequency MEMS switches.

Law etc.

---Part 6: Axial fatigue test method for thin film materials. The purpose is to specify the axial fatigue testing of MEMS thin film materials method.

---Part 7: MEMS bulk acoustic wave filters and duplexers for RF control and selection. The purpose is to specify MEMS body Term definitions, characteristic requirements, test methods, etc. for acoustic resonators, filters, and duplexers.

---Part 8: Strip bending test method for measuring tensile properties of films. The purpose is to specify the parameters used to measure the tensile properties of films.

Strip bend test method.

---Part 9: MEMS wafer bonding strength test method. The purpose is to specify the bonding strength test method for MEMS wafers.

---Part 11: Test method for linear thermal expansion coefficient of suspended MEMS materials. The purpose is to specify the requirements for suspended MEMS materials Linear thermal expansion coefficient test method.

---Part 12: Flexural fatigue test method for thin film materials using MEMS structural resonance method. The purpose is to specify MEMS thin Flexural fatigue test method for membrane materials.

---Part 13: Test method for adhesion strength of MEMS structures. The purpose is to specify the adhesion strength test of MEMS structures method.

---Part 16: Wafer curvature and cantilever deflection test methods for residual stress in MEMS films. The purpose is to stipulate Two test methods for wafer curvature and cantilever beam deflection of MEMS film residual stress.

---Part 19: Electronic compass. The purpose is to specify the term definitions, characteristic requirements, test methods, etc. of electronic compasses.

---Part 21: Poisson's ratio test method for MEMS thin film materials. The purpose is to specify the Poisson's ratio test for MEMS thin film materials method.

---Part 22: Electromechanical tensile test method for conductive films on flexible substrates. The purpose is to specify the MEMS conductive film materials Tensile test methods for electromechanical properties.

---Part 26: Description and test methods of microgroove and needle structures. The purpose is to specify the description of MEMS micro-groove and needle structures.

Description and test methods.

---Part 27: MCT test method for bond strength of glass sintered structures. The purpose is to specify the bonding strength of glass sintered structures Degree of MCT test method.

---Part 29: Test method for electromechanical relaxation of suspended conductive films at room temperature. The purpose is to specify the floating conductor of MEMS devices Test method for electromechanical relaxation of electrical thin films at room temperature.

---Part 32: MEMS resonator nonlinear vibration test method. The purpose is to specify the nonlinear vibration of MEMS resonators Performance testing methods.

---Part 35: Test method for bending deformation electrical characteristics of flexible electromechanical devices. The purpose is to specify the bending deformation of flexible electromechanical devices State Electrical Characteristics Test Method.

---Part 36: Environmental and dielectric withstand test methods for MEMS piezoelectric films. The purpose is to specify the MEMS piezoelectric film Environmental and dielectric endurance performance test methods.

---Part 38: Test method for adhesion strength of metal powder paste in MEMS interconnects. The purpose is to specify MEMS interconnect CICC it is a test method for the adhesion strength of powder paste.

---Part 40: MEMS inertial impact switch threshold test method. The purpose is to specify the

threshold value of the MEMS inertial shock switch Test Methods.

Semiconductor devices Microelectronic mechanical devices Part 19: Electronic Compass

1 Scope

This document defines the terms and definitions of electronic compasses, specifies basic ratings and characteristics, and describes corresponding test methods. This document is suitable for for electronic compasses composed of magnetic sensors and acceleration sensors, or electronic compasses composed of magnetic sensors alone. This document applies to Electronic compass for mobile electronic devices.

For relevant requirements for marine electronic compasses, see ISO 11606.

The types of electronic compasses applicable to this document include two-axis electronic compasses, three-axis electronic compasses, and six-axis electronic compasses.

2 Normative reference documents

This document has no normative references.

3 Terms and definitions

The following terms and definitions apply to this document.

3-axisHelmholtzcoil3-axisHelmholtzcoil Three Helmholtz coils that generate mutually perpendicular magnetic fields.

A magnetic field environment in which the magnetic field intensity in the space where the tested part is located is lower than the specified intensity.

Note: See 4.1.7 for the definition of the component under test.

e-compass

electronic compasselectroniccompass A compass that uses the electrical output of the sensor to calculate and output the azimuth angle.

Note: "eCompass" is used as an abbreviation for electronic compass.

Two-axis electronic compass 2-axis-compass an electronic compass using a two-axis magnetic sensor as a geomagnetic detection element.

Three-axis electronic compass 3-axis-compass an electronic compass using a three-axis magnetic sensor as a geomagnetic detection element.

Six-axis electronic compass 6-axis-compass an electronic compass that uses a three-axis magnetic sensor as the geomagnetic detection element and a three-axis acceleration sensor as the gravity detection element.