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

GB/T 42709.7-2023

**Semiconductor devices - Micro-electromechanical devices -
Part 7: MEMS BAW filter and duplexer for radio frequency
control and selection**

半导体器件 微电子机械器件 第7部分：用于射频控制和选择的MEMS体声波滤波器
和双工器

(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:

This document is Part 7 of GB/T 42709 "Microelectronic Mechanical Devices for Semiconductor Devices": GB/T 42709 has been issued with Lower part:

--- Part 5: RF MEMS switches;

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

--- Part 19: Electronic compass:

This document is equivalent to IEC 62047-7:2011 "Microelectronic Mechanical Devices for

Semiconductor Devices Part 7: For RF Control and Selection Selected MEMS Bulk Acoustic Wave Filters and Diplexers":

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

---According to the textual description of formula (3) in IEC 62047-7:2011, modify the denominator of formula (3) from parallel resonance frequency to series joint resonant frequency:

Please note that some contents of this document may refer to patents: The issuing agency of this document assumes no responsibility for identifying patents:

Introduction

This document is applicable to MEMS bulk acoustic wave resonators, filters and duplexers:

The terms, definitions, symbols, structures, and test methods of industrial equipment are helpful to better guide practitioners in related industries in product development, testing, and testing:

Use etc: to work: GB/T 42709 "Microelectronic Mechanical Devices for Semiconductor Devices" is proposed 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 piece for tensile test: The purpose is to specify test pieces for tensile testing of MEMS thin film materials related requirements:

--- Part 5: RF MEMS switches: The purpose is to specify the term definitions, characteristic requirements, and testing methods of RF MEMS switches:

law etc:

--- Part 6: Thin film material axial fatigue test method: The purpose is to specify the axial fatigue test of MEMS thin film materials method:

--- Part 7: MEMS bulk acoustic wave filters and duplexers for radio frequency control and selection: The purpose is to specify the MEMS body Definition of terms, characteristic requirements, test methods, etc: of acoustic wave resonators, filters and duplexers:

--- Part 8: Strip bending test method for the measurement of film tensile properties: The purpose is to specify the method 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 Test method for coefficient of linear thermal expansion:

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

--- Part 13: MEMS structure adhesion strength test method: The purpose is to specify the adhesion strength test of MEMS structure method:

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

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

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

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

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

--- Part 27: MCT test method for bond strength of glass fused structures: The purpose is to specify the bond strength of the glass frit structure 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 suspended conductance of MEMS devices Test method for electromechanical relaxation of electromechanical 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 method:

--- Part 35: Test methods for electrical characteristics of flexible electromechanical devices bending deformation: 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 withstand performance test methods:

--- Part 38: Test method for adhesion strength of metal powder paste in MEMS

interconnection: The purpose is to specify the gold in the MEMS interconnection it is a test method for the adhesion strength of powder paste:

--- Part 40: MEMS inertial shock switch threshold test method: The purpose is to specify the threshold of MEMS inertial shock switch Test Methods:

Semiconductor Devices Micro-Electro-Mechanical Devices Part 7: For radio frequency control and selection MEMS Bulk Acoustic Wave Filters and Diplexers

1 Scope

This document defines terms and definitions for MEMS bulk acoustic wave resonators, filters and diplexers for radio frequency control and selection, and gives Describes the basic ratings and characteristics, and describes the test methods used to evaluate and determine its performance: This document specifies the requirements for bulk acoustic wave resonators, filters Test methods and general requirements for duplexers for quality assessment of capability approval procedures or qualification approval procedures:

2 Normative references

This document has no normative references:

3 Terms and Definitions

The following terms and definitions apply to this document:

3.1

Basic terms

3.1.1

Bulk acoustic wave; BAW Sound waves propagating inside a solid:

3.1.2

Bulk Acoustic Wave Resonator BAWresonator Devices utilizing bulk acoustic resonance:

NOTE: The bulk acoustic wave resonator consists of upper and lower electrodes and a piezoelectric material in the middle, as shown in Figure 1: The upper and lower electrodes can be in the vertical direction of the piezoelectric film vibration: The gas-solid interface of the two electrodes of the film bulk acoustic resonator (FBAR), or the two electrodes of the solid-state fabricated resonator (SMR) are the acoustic Bragg reflector and gas-solid interface:

Description of index number:

Electrode --- the connector for the piezoelectric film body to output charges to the external circuit;