ICS 31.200
CCS L 40

# NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA



# GB/T 42709.5-2023

## Semiconductor devices - Micro-electromechanical devices - Part 5: RF MEMS switches

**Issued on: May 23, 2023** **Implemented on: September 1, 2023**

**Issued by: State Administration for Market Regulation, China National Standardization Administration**

# Table of Contents





## 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 5 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 62047-5:2011 "Microelectronic Mechanical Devices for Semiconductor Devices Part 5: RF MEMS

switch":

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

--- Incorporate the clauses involved in the contents of the IEC 62047-5:2011/Cor1:2012 errata:

Double lines (||) are marked:

--- Added Appendix NA (informative):

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 RF MEMS switches, and specifies the terms, definitions,

Symbols and parameter testing methods, etc:, are conducive to better guiding practitioners in related industries in product development, testing, and use:

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 5: RF MEMS switches

## 1 Scope

This document defines the terms, definitions and symbols used to evaluate and determine the basic ratings and characteristics of RF MEMS switches, and describes

Parameter test method:

This document is applicable to various types of RF MEMS switches: See Appendix A for