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

GB/T 44513-2024

**Micro-electromechanical systems(MEMS) technology -
Environmental test methods of MEMS piezoelectric thin films
for sensor application**

微机电系统（MEMS）技术 传感器用MEMS压电薄膜的环境试验方法
(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 equivalent to IEC 62047-37:2020 "Semiconductor devices - Microelectromechanical devices - Part 37: MEMS pressure sensors Environmental Test Methods for Thin Film Electrolytes.

The following minimal editorial changes were made to this document.

--- In order to coordinate with the existing standards, the name of the standard will be changed to "MEMS piezoelectric film for micro-electromechanical system (MEMS) technology sensors Environmental Test Methods";

--- Modified the PZT thickness from 3 μ m to 2 μ m in Table A.1 to make the table content correspond to the content of the text in Appendix A.

1 Scope

This document describes the evaluation of the durability of MEMS piezoelectric thin film materials under environmental stress (temperature and humidity), mechanical stress and strain.

This document specifically describes the test methods and test conditions for quality assessment under temperature, humidity conditions and applied voltage.

Test methods and test conditions for device durability.

This document is applicable to the evaluation of the durability and quality of MEMS piezoelectric thin film materials, and also to the evaluation of piezoelectric thin films formed on silicon substrates.

Positive piezoelectric properties of films, such as piezoelectric films used as acoustic sensors or cantilever sensors.

This document does not cover reliability assessments such as methods for predicting the lifetime of piezoelectric films based on the Weibull distribution.

2 Normative references

The contents of the following documents constitute essential clauses of this document through normative references in this document.

For referenced documents without a date, only the version corresponding to that date applies to this document; for referenced documents without a date, the latest version (including all amendments) applies to this document.

IEC 62047-30 Semiconductor devices Microelectromechanical devices Part 30: Measurement of electromechanical conversion characteristics of MEMS piezoelectric films
Note. GB/T 44515-2024 Micro-electromechanical systems (MEMS) technology - Measurement methods for electromechanical conversion characteristics of MEMS piezoelectric films (IEC 62047-30.

2017, IDT)

GB/T 2423.22-2012 Environmental testing Part 2: Test method Test N. Temperature change (IEC 60068-2-14.

2009, IDT)

3 Terms and definitions

There are no terms or definitions that require definition in this document.

4.1 General

The degradation of the device under test is evaluated by measuring the piezoelectric performance before and after applying temperature and humidity environmental stress. Figure 1 shows the test process the basic process.