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**NATIONAL STANDARD OF THE
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**Micro-electromechanical system(MEMS) technology -
Measurement methods of electro-mechanical conversion
characteristics of MEMS piezoelectric thin film**

微机电系统（MEMS）技术 MEMS压电薄膜机电转换特性测量方法

(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 is required.

This document is equivalent to IEC 62047-30:2017 "Semiconductor devices Microelectromechanical devices Part 30: MEMS piezoelectric film machine Electrical conversion characteristics measurement method.

The following minimal editorial changes were made to this document.

--To coordinate with the existing standards, the name of the standard will be changed to "Micro-Electro-Mechanical Systems (MEMS) Technology - MEMS Piezoelectric Thin Film

Electromechanical Transducers" Characteristic Measurement Methods.

--Added notes for 3.2 and 3.3.

-- Figure 1 is further annotated so that the description in Table 1 corresponds to Figure 1.

The principle of the close connection is to explain the basic principle of the functional module or component of the MEMS piezoelectric film transverse piezoelectric coefficient test bench in Figure 1.

This composition is shown in Figure 1" before and after it is adjusted to the position where it appears in Figure 1, i.e., at 4.1.

-- Corrected "ec31,f (min)" in Chapter 6 a) 11) to "ec31,f (V in, min)" and corrected "ec31,f (max)" to "ec31,f (V in, max)".

-- Corrected "ed31, f" in Chapter 6 b) 3) to "ed31, f", corrected "ec31, f (min)" to "ec31, f (V in, min)", corrected "ec31, f (max)" is "ec31,f (V in, max)".

--Corrected "ec31,f(0)" in Chapter 6 b)4) to "ec31,f (V in,0)".

-- Corrected A.3.2."ec31,f (V in,0) and ec31,f (V in, max) can be determined as 10.0 N/Vm and 15.0 N/Vm respectively" to "|ec31,f (V in,0) | and |ec31,f (V in, max) | can be determined to be 10.6 N/Vm and 15.0 N/Vm, respectively".

--Corrected the calculated result of positive transverse piezoelectric coefficient "ed31,f" in Table A.3 to a negative value.

-- Corrected "ec31,f (min)" in item 11 of Table A.6 to "ec31,f (V in, min)" and corrected "ec31,f (max)" to "ec31,f (V in, max)".

1 Scope

This document describes methods for measuring the electromechanical transduction characteristics of piezoelectric films used in devices such as piezoelectric microsensors and microactuators.

This document applies to piezoelectric films prepared by MEMS technology.

2 Normative references

This document has no normative references.

3 Terms and definitions

The following terms and definitions apply to this document.

Unimorph beam

A beam consisting of a layer of piezoelectric film on a substrate.

Direct transverse piezoelectric coefficient the charge or voltage generated by strain or stress is used to calculate the transverse piezoelectric coefficient of the piezoelectric film.

Note: When used for piezoelectric films, it is generally expressed as the positive equivalent transverse piezoelectric coefficient.

Converse transverse piezoelectric coefficient the strain or stress caused by the electric field or voltage is used to calculate the transverse piezoelectric coefficient of the piezoelectric film.

Note: When used for piezoelectric films, it is generally expressed as the inverse equivalent transverse piezoelectric coefficient.

4.1 General

The following transverse piezoelectric properties measurement method is applicable to single piezoelectric layer beams. Functions of MEMS piezoelectric film transverse piezoelectric coefficient test bench the basic structure of the module or component is shown in Figure 1. The symbols and names of the test bench are shown in Table 1.