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

GB/T 11297.9-2015

Replacing GB 11297.9-1989

**Test method for dielectric tangent of loss angle of pyroelectric
materials**

热释电材料介质损耗角正切 $\tan\delta$ 的测试方法

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Foreword

This section drafted in accordance with GB/T 1.1-2009 given rules. This Part replaces GB/T 11297.9-1989 "pyroelectric materials dielectric loss tangent $\tan\delta$ of the test method."

This portion GB 11297.9-1989 compared to the main technical changes are as follows:

- Modify the applicable frequency range (see Chapter 1);
- Modify the sample size requirements (see Chapter 6, 1989 edition 3.2);
- Increased the lead measurement requirements (see Chapter 7);
- Modify the frequency of the maximum permissible error (see Chapter 7, 1989 edition 4.2);
- Modify the measure $\tan\delta$ value of the maximum permissible error (see Chapter 7, 1989 edition 4.1);
- Modify the sample processing (see 81, 1989 Version 5.1.);
- Added "first sample cartridge into the thermostat, then the sample holder access sample box" and by open and short correction instrument Accurate, direct measurement of the sample dielectric loss tangent $\tan\delta$ [see 8.2b) ~ f)]. Please note that some of the content of this document may involve patents. Release mechanism of the present document does not assume responsibility for the identification of these patents. This part is proposed by the Ministry of Industry and Information Technology of the People's Republic of China. This part of the jurisdiction of the Ministry of Industry and Information Technology Institute of Electronics Standardization. This section is drafted. Shanghai Institute of Ceramics. The main drafters of this section. Yao Chunhua, Cao Fei, Dong Xianlin, Wang root water, Wang age. This part of the standard replaces the previous editions are.
- GB/T 11297.9-1989. Pyroelectric materials dielectric loss tangent $\tan\delta$ of Test Methods

1 Scope

GB/T 11297.9-2015 is the Chinese national standard on test method for dielectric tangent of loss angle of pyroelectric materials, in the field of electronics. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 31 December 2015 by the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China; Standardization Administration of China, and has been in force since 1 July 2016. Classification: ICS 31.020, CCS L90. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This section provides pyroelectric ceramics, crystal and organic material in the range of 100Hz ~ 100kHz dielectric loss tangent $\tan\delta$ measured Volume method. This section applies to the measurement of lead titanate, lead zirconate titanate, barium strontium titanate, tantalum scandium acid pyroelectric ceramic material such as lead and lead magnesium niobate, lithium tantalate, Dielectric loss angle three glycine sulfate group, etc., pyroelectric crystal material tangent $\tan\delta$, is also applicable to other similar measure ceramics, crystal and there Kok dielectric loss tangent of pyroelectric material $\tan\delta$.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document. SJ/T 11067 infrared detecting material semiconductor optoelectronic materials and pyroelectric materials commonly used terminology

3 Terms and Definitions

SJ/T 11067 and defined by the following terms and definitions apply to this document.

3.1 Dielectric loss dielectricloss Any dielectric (including pyroelectric materials) energy in an alternating electric field under the action of heat generated due to the loss.

4 Measuring principle

Measure the size of this loss factor is $\tan\delta$, called dielectric loss angle (δ) tangent, is a dimensionless physical quantity. Dielectric loss Angle (δ) expressed as active power (P) and reactive power (Q) ratio, see equation (1). $\tan\delta = (1) \text{ Tangent } (\tan\delta)$ of the measurement and calculation methods dielectric loss angle, there are two equivalent circuit in Figure 1 represent the two equivalent circuit and Vector Volume plot. Figure 1 shows the parallel loss tangent can be expressed as the formula (2). $\tan\delta = IR / IC = \omega C_p R_p$

(2) Series loss tangent can be expressed as the formula (3). $\tan \delta = \frac{U_R}{U_C} = \omega C_s R_s$ (3) Where. Angular frequency ω

--- applied AC voltage, the unit is second (s⁻¹).

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