

ICS 77.040
CCS H 21

YS

**NONFERROUS METALS INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

YS/T 15-2015

Replacing YS/T 15-1991

**Test method for thickness of epitaxial layers and diffused layers
by angle lap stain**

硅外延层和扩散层厚度测定磨角染色法

(English Translation)

Issued on: April 30, 2015

Implemented on: October 1, 2015

Issued by: Ministry of Industry and Information Technology

Table of Contents

Foreword
1 Scope
2 Normative references
3 Terms and Definitions
4 Method summary
5 Disturbances
6 Reagents and materials

Foreword

This standard was drafted in accordance with GB/T 1.1-2009 given rules.

Instead of the standard YS/T 15-1991 "silicon epitaxial layer and the diffusion layer thickness measurement Bevelers staining." this standard YS/T 15-1991 "determination of silicon epitaxial layer and the diffusion layer thickness Bevelers staining" compared to the main changes are as follows.

Measuring range --- original "1 μ m ~ 25 μ m" to "1 μ m ~ 100 μ m";

--- Normative references added GB/T 6617, GB/T 14146, GB/T 14264, GB/T 14847;

--- Increasing the terms and definitions, disturbances;

--- Method summary with microscopic image processing technology instead of the interference fringe computing Layer Thickness;

--- "Reagents and Materials" Remove reagents and materials related to the interference fringes law;

--- Deleted the original 2, increasing the bevel schematic;

--- Modify the calculation and measurement procedures measurement results;

--- Redefined precision.

This standard by the national non-ferrous metals Standardization Technical Committee (SAC/TC243) and focal points.

This standard was drafted. Nanjing Guosheng Electronics Co., have research New Material Co., Ltd. Shanghai Jing League silicon material.

1 Scope

This standard specifies the determination of silicon epitaxial layer and the diffusion layer thickness Bevelers staining.

This standard applies to the epitaxial layer and a diffusion layer and a conductive substrate, or two different types of electrical resistivity by at least an order of magnitude of any resistance Silicon epitaxial layer and the diffusion layer thickness measurement rate measurement range of $1\mu\text{m} \sim 100\mu\text{m}$.

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.

GB/T 1550 extrinsic conductivity type semiconductor material testing methods GB/T 6617-2009 measuring resistivity silicon spreading resistance probe GB/T 14146 silicon epitaxial layer carrier concentration - Mercury probe capacitance - voltage method GB/T 14264 semiconductor material terms GB/T 14847 lightly doped silicon epitaxial layer on the substrate thickness infrared reflectance measurements heavily doped

3 Terms and Definitions

Terms and definitions GB/T 14264 apply to this document defined.

4 Method summary

The sample was milled to obtain a small angle to the original surface slope, by staining revealed the interface between the layers on an incline.

Image processing technology using a microscope to read thin ramp length is calculated according to the length of the thin layer thickness ramps.

5 Disturbances

5.1

After dyeing blur the boundary between layers will affect the accuracy of the results.

5.2 9.3 difference operation will bring the measurement results on the computer screen image when the value of.

Fig. 3 AB line should be perpendicular to the dividing line between the layers after dyeing, otherwise it will increase the measurement error when measuring 5.3.

6 Reagents and materials

6.1

hydrofluoric acid. ($\rho = 1.15\text{g/mL}$) AR.

6.2

Hydrogen peroxide (37), AR.

6.3

High water. resistivity greater than $2\text{Mohm} \cdot \text{cm}$ ($25\text{ }^{\circ}\text{C}$).

6.4

etching solution. the hydrofluoric acid (6.1) and hydrogen peroxide (6.2) uniformly by 2.1 volume ratio.