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NATIONAL STANDARD OF THE
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ICS 29.045

H 80

GB/T 16595-2019

Replacing GB/T 16595-1996

Specification for a Universal Wafer Grid

晶片通用网格规范

Issued on: March 25, 2019

Implemented on: February 01, 2020

Issued by: State Administration for Market Regulation;

**Standardization Administration of the People's Republic of
China.**

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Foreword

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

This Standard replaces GB/T 16595-1996, "Specification for a universal wafer grid". Compared with GB/T 16596-1996, the main technical changes, except editorial changes, are as follows:

- Add the scope of application "This Standard applies to silicon wafers of which the nominal diameter is 100 mm ~ 200 mm; it also applies to other semiconductor material wafers" (see Chapter 1);
- Include part of the contents of "Chapter 1, Scope", in "5 Application of grids" (see Chapter 5, Chapter 1 of version 1996);
- Delete GB/T 1554, YS/T 209, SEMI M1, SEMI M2 and SEMI M11 in "Normative references"; add GB/T 30453 (see Chapter 2, Chapter 2 of version 1996);
- Modify the contents of 4.1.2 of "4.1, Grid cell plan", into "the selection of the grid outer diameter shall take into account the edge removal, diameter allowable deviation and chamfer of the wafer. Generally, the grid outer diameter is selected as the diameter of the qualified mass zone, wherein the radius of the qualified mass zone is 3 mm or 4 mm smaller than the nominal radius of the wafer; the corresponding grid circle diameter is shown in Table 2" (see 4.1.2, 4.1.2 of version 1996);
- Add grid circle diameters for wafers whose diameters are 150 mm and 200 mm, of which the qualified mass radius is 4 mm smaller than the nominal radius of the wafer (see Table 2);
- Modify the contents of the "4.4, Wafer with sub-reference plane" into "when a qualified mass area whose radius is 3 mm smaller than the wafer nominal radius is used, the grids will not exceed the edge of the wafer sub-reference plane area; therefore, the grid ignores the sub-reference plane" (see 4.4, 4.4 of version 1996);
- Add "5 Application of grids" (see Chapter 5).

This Standard is jointly proposed and managed by the National Semiconductor Equipment and Materials Standardization Technical Committee (SAC/TC 203) and the National Semiconductor Equipment and Materials Standardization Technical Committee Material Subcommittee (SAC/TC 203 / SC 2).

The drafting organizations of this Standard: Zhejiang Haina Semiconductor Co., Ltd., China Nonferrous Metals Techno-Economic Research Institute, GRINM

Specification for a Universal Wafer Grid

1 Scope

This Standard specifies grid patterns that can be used to quantitatively describe surface defects on a circular semiconductor wafer.

This Standard applies to silicon wafers of which the nominal diameter is 100 mm ~ 200 mm; it also applies to other semiconductor material wafers

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the dated version applies to this document. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 6624, Standard method for measuring the surface quality of polished silicon slices by visual inspection

GB/T 12964, Monocrystalline silicon polished wafers

GB/T 14139, Silicon epitaxial wafers

GB/T 14142, Test method for crystallographic perfection of epitaxial layers in silicon. Etching technique

GB/T 14264, Semiconductor materials. Terms and definitions

GB/T 30453, Metallographs collection for original defects of crystalline silicon

3 Terms and definitions

Terms and definitions determined by GB/T 14264 are applicable to this document.

4 Grid cell layout

4.1 Grid cell plan

4.1.1 The grid, which is positioned by the wafer center, defines two grids: one for the wafer without main reference plane (that is, the main positioning

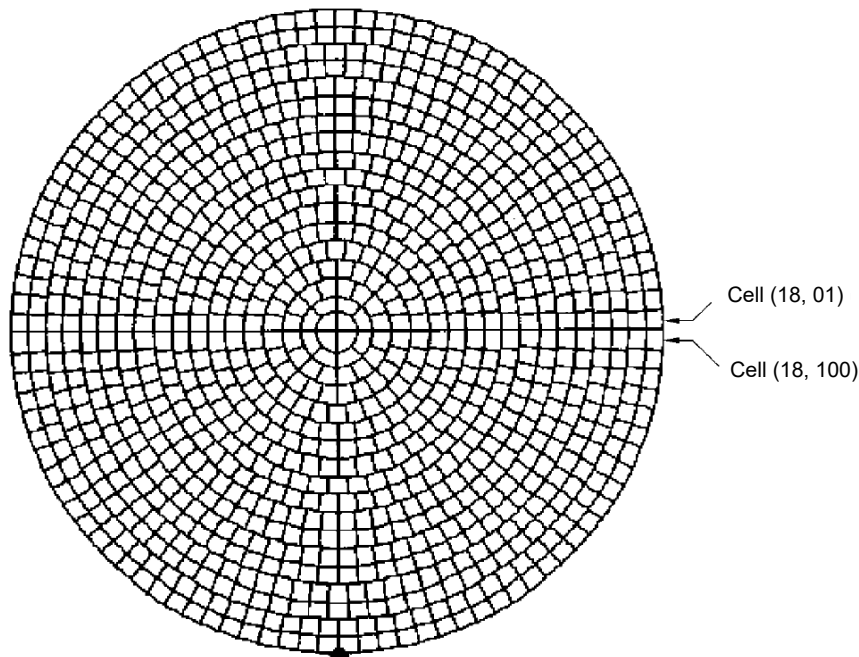


Figure 1 -- Grid diagram without main reference plane wafer

4.2 Wafer without main reference plane

4.2.1 The grid pattern without main reference plane wafer is shown in Figure 1. The grid pattern is drawn by concentric circles and radial division cells from the relative diameters that are specified in Table 1.

4.2.2 In Table 1, column 1 shows the circle numbers, 01~18; column 2 shows the division cell numbers on the outermost ring of the numbered circle; column 3 shows the division line angle; column 4 shows the total division cell number of the corresponding numbered circle; column 5 shows the area ratio that is included in the circle of corresponding serial number, the value of which is the total number of division cells that are contained in the circle divided by the total number of division cells of the grid 1 000; column 6 shows the relative diameter, the value of which is the square root of the included area ratio.

4.3 Wafer with main reference plane

4.3.1 For wafers with main reference plane, use the standard included angle of 43.2° as the central angle that corresponds to the intersection of all the arcs of the wafer and the horizontal chord. The standard angle is chosen because the angle is between the maximum and minimum central angles corresponding to the main reference surface chords that are specified in the nominal diameters of 100 mm, 125 mm, 150 mm and 200 mm which are specified in GB/T 12964, as shown in Figure 2. If a qualified mass area whose radius is 3 mm (or 4 mm) less than the nominal radius of the wafer is used, in no case will the grid exceed the edge of the main reference plane area of the wafer.

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