

# Standard specifications of

## 2 inch / 100 mm $\beta$ -Ga<sub>2</sub>O<sub>3</sub> (001) epitaxial wafer (by HVPE)

### Epitaxial layer

| Items                                             | Specifications               |
|---------------------------------------------------|------------------------------|
| Dopant                                            | Si+Cl <sup>*1</sup> (n-type) |
| Doping concentration (cm <sup>-3</sup> )          | $1 \times 10^{16}$           |
| Thickness (μm)<br>*Selectable in 1 μm increments. | 5–10                         |

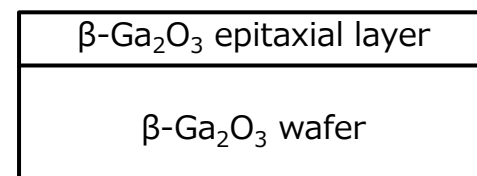
\*1: Unintentionally-doped

### Epi-Wafer

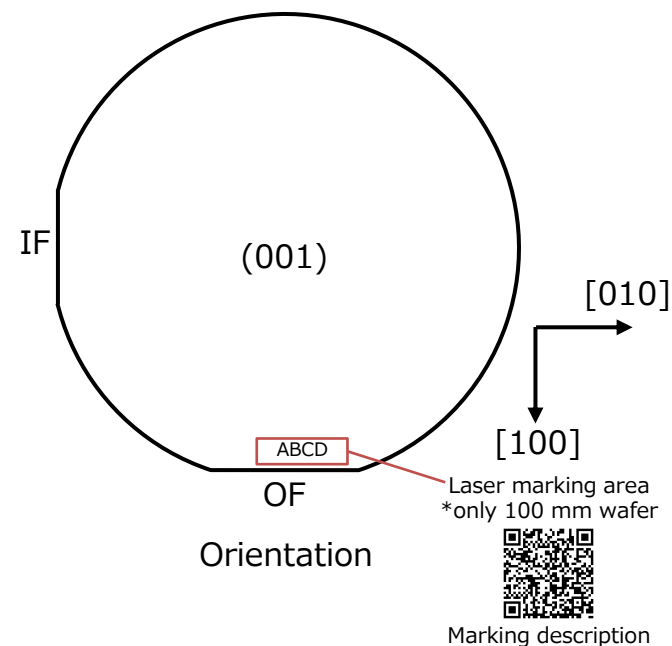
| Items                                                          | Specifications |
|----------------------------------------------------------------|----------------|
| Substrate dopant                                               | Sn (n-type)    |
| Substrate resistivity (Ω·cm)                                   | 0.007–0.042    |
| Surface orientation                                            | (001)          |
| Backside finish                                                | CMP            |
| Wafer thickness (μm)                                           | 650            |
| XRD FWHM (arcsec)<br>*Not listed on delivery inspection sheet. | ≤ 50           |

#### Remarks

- Chipping may occur within the following limits:  
2-inch: <8 mm (opposite OF), <15.9 ± 2.5 mm (OF side); 100 mm: <18 mm (opposite OF), <32.5 ± 2.5 mm (OF side).
- These products must be used for research and development purposes only.
- The substrates must not be used as a seed crystal.
- The specifications are subject to change without notice.



Cross section of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> epitaxial wafer



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2025. 12. 16

# 2 inch / 100 mm $\beta$ -Ga<sub>2</sub>O<sub>3</sub> (001) epitaxial wafer (by HVPE) for developing planar SBD

## Epitaxial layer

| Items                                    | Specifications                            |
|------------------------------------------|-------------------------------------------|
| Dopant                                   | Si+Cl <sup>*1</sup> (n-type)              |
| Doping concentration (cm <sup>-3</sup> ) | The mid to late order of 10 <sup>15</sup> |
| Thickness (μm)                           | 15                                        |

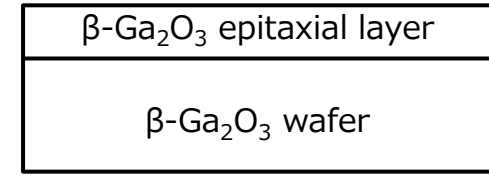
\*1: Unintentionally-doped

## Epi-Wafer

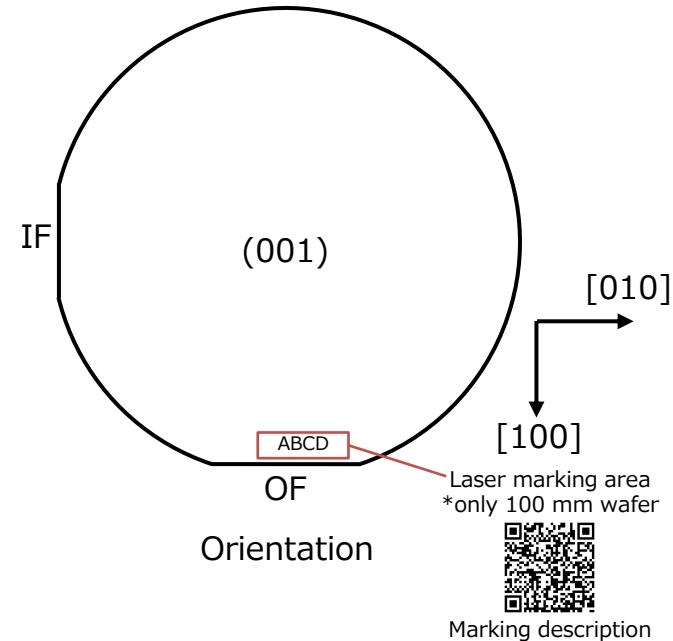
| Items                                     | Specifications |
|-------------------------------------------|----------------|
| Substrate dopant                          | Sn (n-type)    |
| Substrate resistivity (Ω·cm)              | 0.007–0.042    |
| Surface orientation                       | (001)          |
| Backside finish                           | CMP            |
| Wafer thickness (μm)                      | 650            |
| XRD FWHM (arcsec)                         | ≤ 50           |
| *Not listed on delivery inspection sheet. |                |

### Remarks

- Chipping may occur within the following limits:  
2-inch: <8 mm (opposite OF), <15.9 ± 2.5 mm (OF side); 100 mm: <18 mm (opposite OF), <32.5 ± 2.5 mm (OF side).
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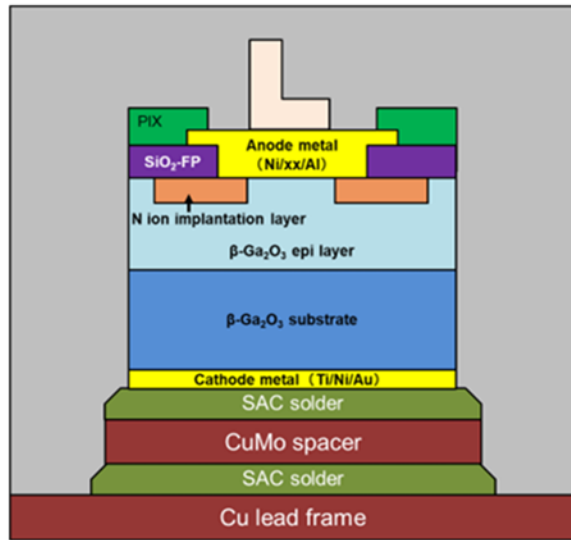
Cross section of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> epitaxial wafer



**Novel Crystal Technology, Inc.**

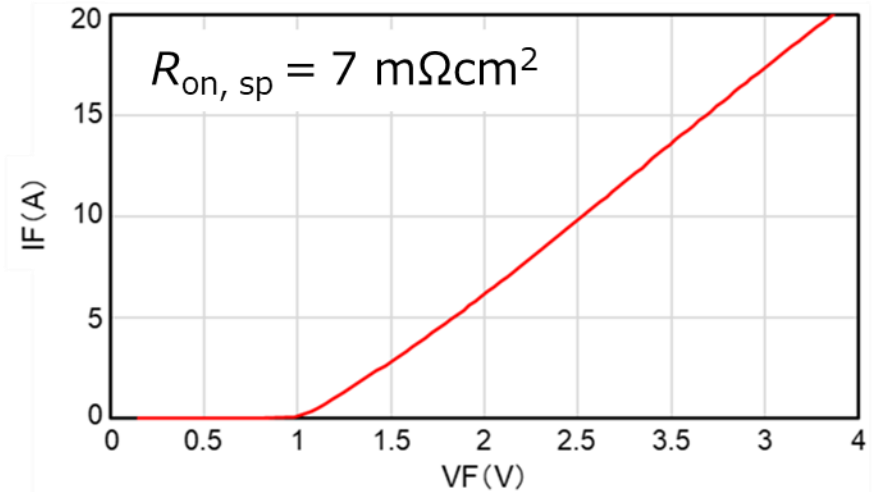
2025. 12. 16

# Example of SBD characteristics using the epi-wafer for developing planar SBD

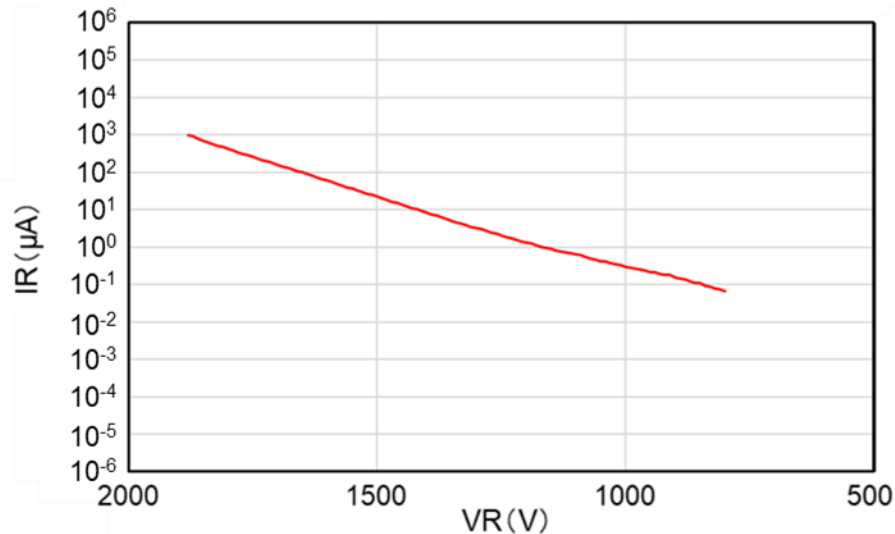


Schematic cross-section

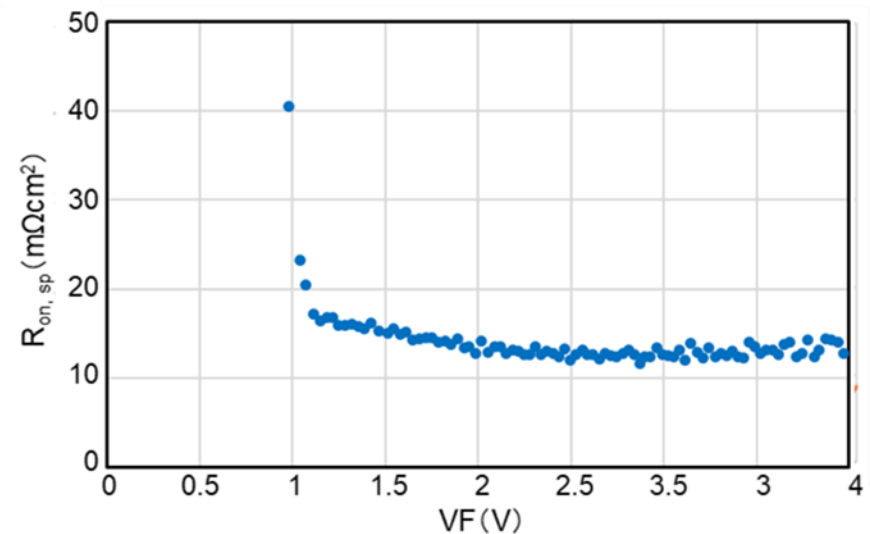
Anode electrode size:  $2.4 \times 2.4 \text{ mm}^2$



Forward characteristics



Reverse characteristics



$R_{on, sp}$  dependence on  $V_F$

2 inch / 100 mm β-Ga<sub>2</sub>O<sub>3</sub> (001) epitaxial wafer (by HVPE)  
for developing intermediate breakdown voltage trench MOSSBD

Epitaxial layer

| Items                                                                                                                   | Specifications               |
|-------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Dopant                                                                                                                  | Si+Cl <sup>*1</sup> (n-type) |
| Doping concentration (cm <sup>-3</sup> )<br><small>*Selectable in 1×10<sup>16</sup> cm<sup>-3</sup> increments.</small> | 4–9×10 <sup>16</sup>         |
| Thickness (μm)<br><small>*Selectable in 1 μm increments.</small>                                                        | 5–10                         |

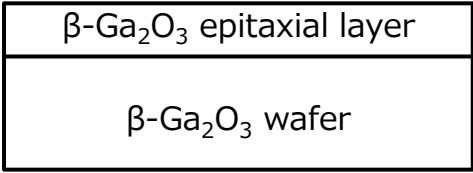
\*1: Unintentionally-doped

Epi-Wafer

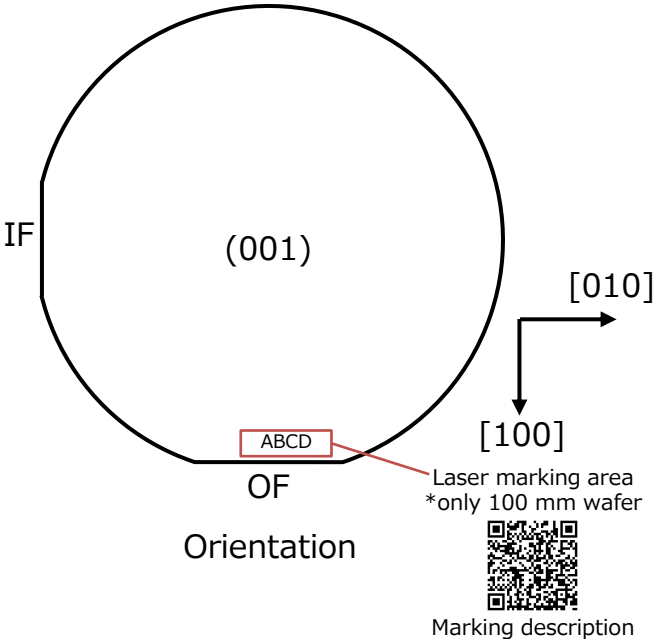
| Items                                                                         | Specifications |
|-------------------------------------------------------------------------------|----------------|
| Substrate dopant                                                              | Sn (n-type)    |
| Substrate resistivity (Ω·cm)                                                  | 0.007–0.042    |
| Surface orientation                                                           | (001)          |
| Backside finish                                                               | CMP            |
| Wafer thickness (μm)                                                          | 650            |
| XRD FWHM (arcsec)<br><small>*Not listed on delivery inspection sheet.</small> | ≤ 50           |

Remarks

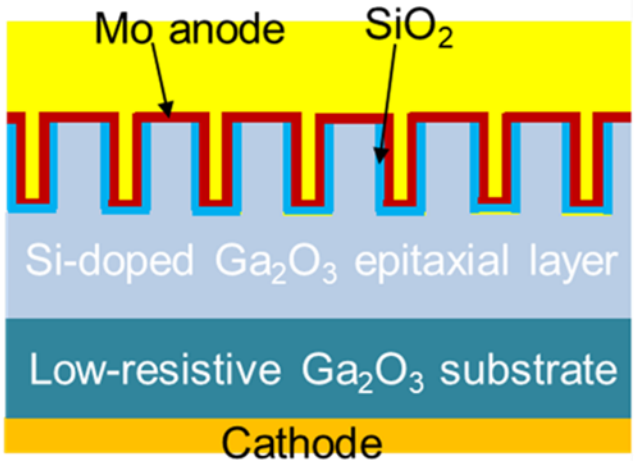
- 1 Chipping may occur within the following limits:  
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- 2 These products must be used for research and development purposes only.
- 3 The substrates must not be used as a seed crystal.
- 4 The specifications are subject to change without notice.



Cross section of β-Ga<sub>2</sub>O<sub>3</sub> epitaxial wafer

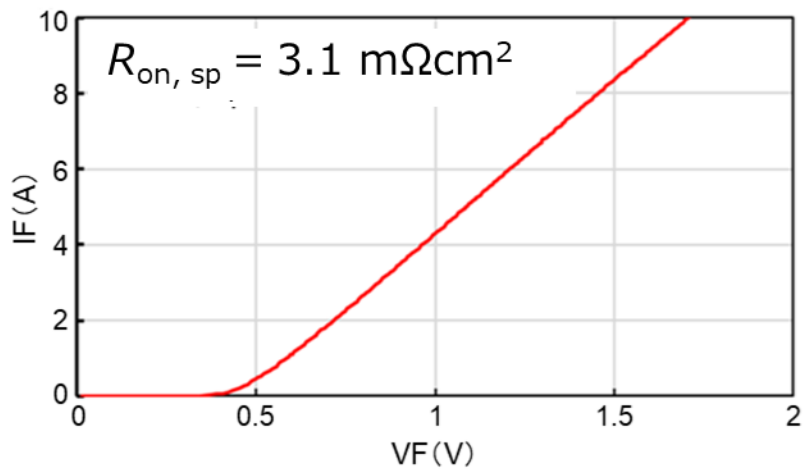


# Example of SBD characteristics using the epi-wafer for developing intermediate breakdown voltage trench MOSSBD

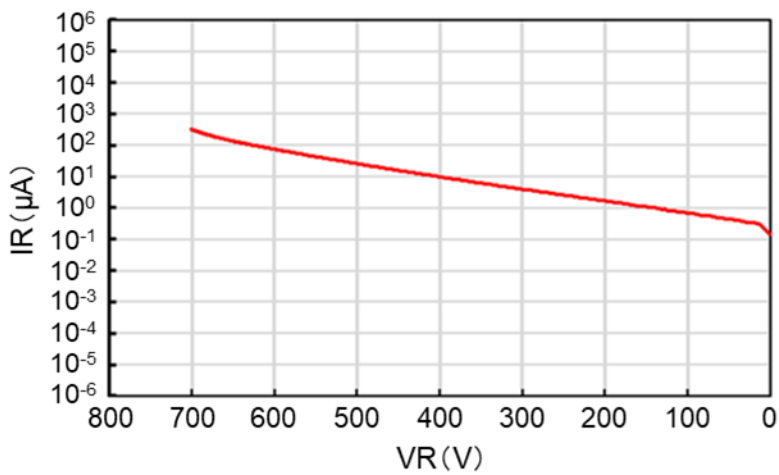


Schematic cross-section

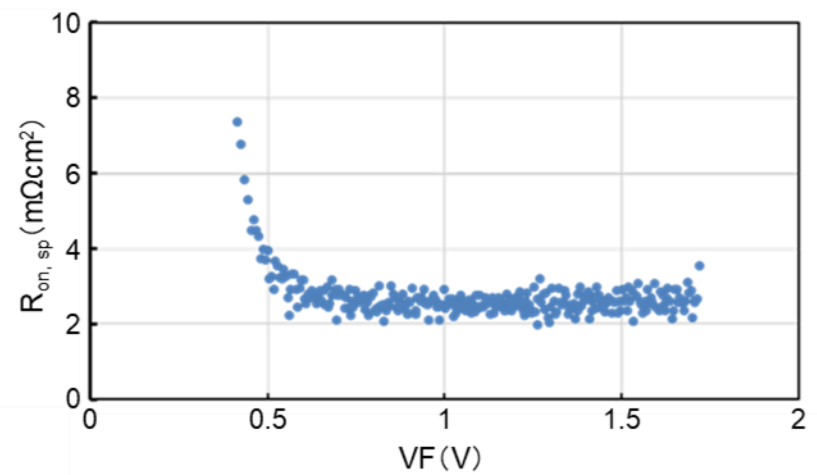
Anode electrode size:  $1.7 \times 1.7 \text{ mm}^2$



Forward characteristics



Reverse characteristics



$R_{on, sp}$  dependence on  $V_F$

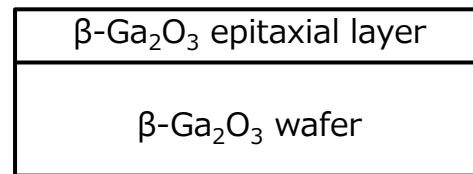
# Standard specifications of 10×15 mm<sup>2</sup> $\beta$ -Ga<sub>2</sub>O<sub>3</sub> (011) epitaxial wafer (by HVPE)

## Epitaxial layer

| Items                                             | Specifications                              |
|---------------------------------------------------|---------------------------------------------|
| Dopant                                            | Si <sup>*1</sup> +Cl <sup>*1</sup> (n-type) |
| Doping concentration (cm <sup>-3</sup> )          | $2 - 5 \times 10^{15}$                      |
| Thickness (μm)<br>*Selectable in 1 μm increments. | $20 - 30^{*2}$                              |

\*1: Unintentionally-doped

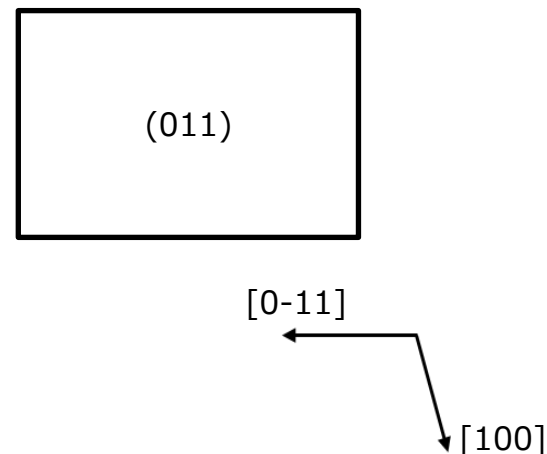
\*2: We will include the 40 μm specification once it becomes available.



Cross section of  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> epitaxial wafer

## Epi-Wafer

| Items                                              | Specifications |
|----------------------------------------------------|----------------|
| Substrate dopant                                   | Sn (n-type)    |
| Substrate resistivity ( $\Omega \cdot \text{cm}$ ) | 0.02–0.1       |
| Surface orientation                                | (011)          |
| Backside finish                                    | CMP            |
| Wafer thickness (μm)                               | 450            |



### Remarks

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- 2 The substrates must not be used as a seed crystal.
- 3 The specifications are subject to change without notice.

