

Doped Epilayer Specification

Item	Spec.
Dopant	Si (n-type)
Doping Level	1E16 to 3E19
*Thickness	4 nm to 4000 nm

* Substrate dependent

Cross-section

Single-layer or Multi-layer structure

β -Ga₂O₃ or C-plane Sapphire

** β -Ga₂O₃ Wafer Specification

Item	Spec.
Resistivity	Conductive/Semi-insulating
Orientation	(100)/(010)
Misorientation	(100): 4°
***Substrate Thickness	0.4 mm to 0.6 mm
Substrate Size	10 x 10 mm ² /10 x 15 mm ² /2 inch/4 inch/
XRD FWHM	<= 100 arcsec

** Substrate choice in next slide

*** Supplier dependent

β -Ga₂O₃ Substrate Choice

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Orientation	Growth Method	Dopant	*Size
(010)	EFG	Sn	10 x 15 mm ²
(010)	EFG	Fe	10 x 15 mm ²
(100)	Cz	Mg	10 x 10 mm ²
(010)	Cz	Fe	10 x 10 mm ²
(100)	Casting	Mg	10 x 10 mm ² /2 inch/4 inch
(100)	Casting	Fe	10 x 10 mm ² /2 inch/4 inch
(100)	Casting	Sn	10 x 10 mm ² /2 inch/4 inch
(010)	Casting	Fe	10 x 10 mm ²

* 2 inch and 4 inch are temporarily for limited customers.

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β-Ga₂O₃ Substrate Specification

	Casting Growth	EFG Growth	Cz Growth
Material	Sn-doped	Sn-doped, undoped, Fe-doped	Mg-doped, Fe-doped
Orientation	(100)	(001), (010)	(100), (010)
Available Sizes	4" , 2", 10×10 mm ² pieces	4", 2", 10×15 mm ² pieces	10×10 mm ² pieces
Thickness	650 ± 20 μm (4"), 500 ± 20 μm (2"; 10×10 mm ²)	650 ± 20 μm (2", 4"), 500 ± 20 μm (10×15 mm ²)	500 ± 20 μm (10×10 mm ²)
Resistivity	0.014–0.020 Ω·cm (measured)	> 10 ¹⁰ Ω·cm (Fe-doped), 0.007–0.042 Ω·cm (Sn-doped)	> 10 ¹⁰ Ω·cm
XRD FWHM	≤150 arcsec	(001): ≤50 arcsec; (010): ≤150 arcsec	≤150 arcsec
Defect Density	10 ³ –10 ⁴ cm ⁻² (reported)	Not specified	(100): < 10 ³ cm ⁻² , (010): Not specified
Surface	CMP-polished	CMP-polished	CMP-polished

Sapphire Substrate Specification

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	Description
Material	Monocrystalline Al_2O_3
Orientation	C-plane (0001) off angle toward M-axis $0.2 \pm 0.1^\circ$
Available Sizes	4" , 2"
Thickness	$650 \pm 20 \mu\text{m}$ (4"), $430 \pm 20 \mu\text{m}$ (2")
Resistivity	$0.014\text{--}0.020 \Omega\cdot\text{cm}$ (measured)
Surface	Epi-polished, $R_a < 0.2 \text{ nm}$