Standard specifications of 4 inch Sn-doped β-Ga_2O_3 substrates

4 inch substrates		
Orientation		(001)
Dopant		Sn
Conductivity		n-type
Dimensions	Diameter (mm)	100 ±0.5
	First orientation flat width (mm)	32.5 ±2.5
	Second orientation flat width (mm)	22.0 ±2.5
	Thickness (mm)	0.65 ±0.02
	Reference	Fig. 1
Surface	Front	CMP
	Back	Grinding

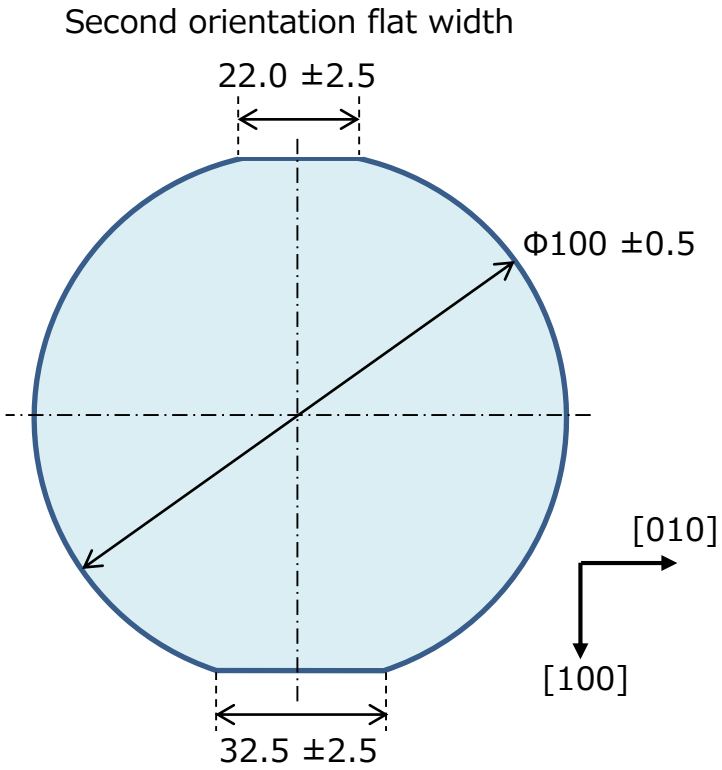

Fig. 1

Remarks

1 These products must be used for research and development purposes only.
2 The substrates must not be used as a seed crystal.
3 The specifications are subject to change without notice.

Novel Crystal Technology, Inc.

Standard specifications of 2 inch β-Ga_2O_3 substrates

		2 inch substrates			
Orientation		(001)	($\bar{2}$01)		
Dopant		Sn	Sn	Unintentionally-doped	Fe
Conductivity		n-type	n-type	n-type	Insulating ($>10^{10}\Omega\cdot$cm)
N_d-N_a (cm^{-3})		$1\times10^{18}\sim2\times10^{19}$	$1\times10^{18}\sim9\times10^{18}$	$\geqq9\times10^{17}$	-
Dimensions	A-B (mm)	50.8 ±0.3	50.8 ±0.3	50.8 ±0.3	50.8 ±0.3
	C-D (mm)	49.5 ±0.3	49.5 ±0.3	49.5 ±0.3	49.5 ±0.3
	Thickness (mm)	0.65 ±0.02	0.68 ±0.02	0.68 ±0.02	0.68 ±0.02
	Reference	Fig. 1	Fig. 2	Fig. 2	Fig. 2
Offset angle (degree)		[010]:0 ±1	[010]: 0 ±0.4	[010]: 0 ±0.4	[010]:0 ±1
		[100]:0 ±1	[102]:-0.7 ±0.4	[102]:-0.7 ±0.4	[102]:-0.7 ±1
FWHM (arcsec)		[010]:350 or less	[010]:150 or less	[010]:150 or less	[010]:150 or less
		[100]:350 or less	[102]:150 or less	[102]:150 or less	[102]:150 or less
Surface	Front	CMP	CMP	CMP	CMP
	Back	Grinding	Grinding	Grinding	Grinding

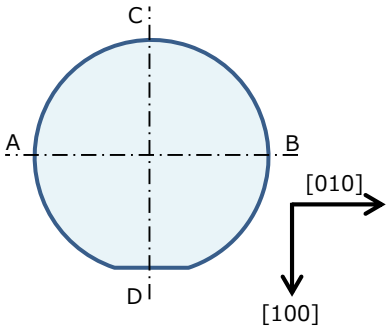

Fig. 1

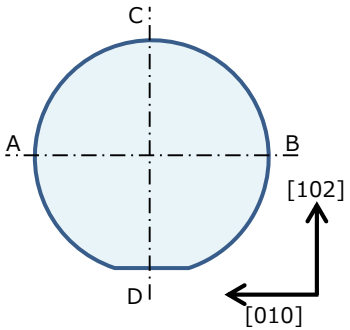

Fig. 2

Remarks

1 These products must be used for research and development purposes only.
2 The substrates must not be used as a seed crystal.
3 The specifications are subject to change without notice.

Novel Crystal Technology, Inc.

Standard specifications of 25x25 mm² β-Ga_2O_3 substrates

		25x25 mm²substrates
Orientation		(010)
Dopant		Fe
		Insulating (＞10^{10}Ω・cm)
Conductivity		-
N_d-N_a (cm^{-3})		25 +0.3, -1
Dimensions	A-B (mm)	25 +0.3, -1
	C-D (mm)	0.5 ±0.02
	Thickness (mm)	Fig. 3
	Reference	[001]:0 ±1
Offset angle (degree)		⊥[001]:0 ±1
		[001]:350 or less
FWHM (arcsec)		⊥[001]:350 or less
		CMP
Surface	Front	Grinding
	Back	Fe

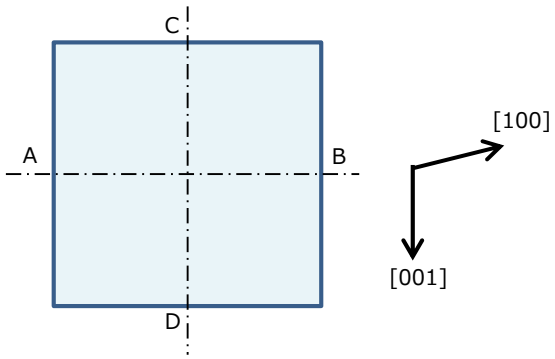

Fig. 3

Remarks

1 These products must be used for research and development purposes only.
2 The substrates must not be used as a seed crystal.
3 The specifications are subject to change without notice.

Novel Crystal Technology, Inc.

Standard specifications of 10x15 mm² β-Ga_2O_3 substrates

		10x15 mm² substrates					
Orientation		($\bar{2}$01)			(010)		
Dopant		Sn	Unintentionally-doped	Fe	Sn	Unintentionally-doped	Fe
Conductivity		n-type	n-type	Insulating (> 10^{10}Ω・cm)	n-type	n-type	Insulating (> 10^{10}Ω・cm)
N_d-N_a (cm^{-3})		1×10^{18}～9×10^{18}	≧9×10^{17}	-	1×10^{18}～9×10^{18}	≧9×10^{17}	-
Dimensions	A-B (mm)	15 ±0.3	15 ±0.3	15 ±0.3	15 ±0.3	15 ±0.3	15 ±0.3
	C-D (mm)	10 ±0.3	10 ±0.3	10 ±0.3	10 ±0.3	10 ±0.3	10 ±0.3
	Thickness (mm)	0.68 ±0.02	0.68 ±0.02	0.68 ±0.02	0.5 ±0.02	0.5 ±0.02	0.5 ±0.02
	Reference	Fig. 4	Fig. 4	Fig. 4	Fig. 5	Fig. 5	Fig. 5
Offset angle (degree)		[010]: 0 ±0.4	[010]: 0 ±0.4	[010]: 0 ±1	⊥[102]:0 ±1	⊥[102]:0 ±1	⊥[102]:0 ±1
		[102]:-0.7 ±0.4	[102]:-0.7 ±0.4	[102]:-0.7 ±1	[102]:0 ±1	[102]:0 ±1	[102]:0 ±1
FWHM (arcsec)		[010]:150 or less	[010]:150 or less	[010]:150 or less	⊥[102]:150 or less	⊥[102]:150 or less	⊥[102]:150 or less
		[102]:150 or less	[102]:150 or less	[102]:150 or less	[102]:150 or less	[102]:150 or less	[102]:150 or less
Surface	Front	CMP	CMP	CMP	CMP	CMP	CMP
	Back	Grinding	Grinding	Grinding	Grinding	Grinding	Grinding

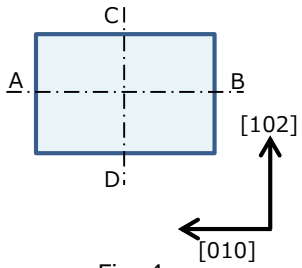

Fig. 4

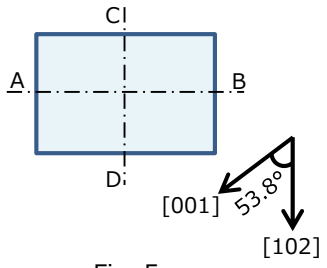

Fig. 5

Remarks

1 These products must be used for research and development purposes only.
2 The substrates must not be used as a seed crystal.
3 The specifications are subject to change without notice.

Novel Crystal Technology, Inc.

Standard specifications of 10x15 mm² β-Ga_2O_3 substrates

		10x15mm² substrates		
Orientation		(001)		
Dopant		Sn	Unintentionally-doped	Fe
Conductivity		n-type	n-type	Insulating ($>10^{10}\Omega\cdot$cm)
N_d-N_a (cm^{-3})		$1\times10^{18}\sim20\times10^{18}$	$\geqq9\times10^{17}$	-
Dimensions	A-B (mm)	15 ±0.3	15 ±0.3	15 ±0.3
	C-D (mm)	10 ±0.3	10 ±0.3	10 ±0.3
	Thickness (mm)	0.65 ±0.02	0.65 ±0.02	0.65 ±0.02
	Reference	Fig. 5	Fig. 5	Fig. 5
Offset angle (degree)		[010]:0 ±1	[010]:0 ±1	[010]:0 ±1
		[100]:0 ±1	[100]:0 ±1	[100]:0 ±1
FWHM (arcsec)		[010]:150 or less	[010]:150 or less	[010]:150 or less
		[100]:150 or less	[100]:150 or less	[100]:150 or less
Surface	Front	CMP	CMP	CMP
	Back	Grinding	Grinding	Grinding

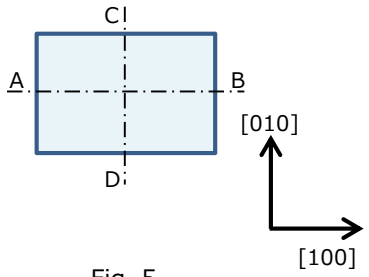

Fig. 5

Remarks

1 These products must be used for research and development purposes only.
2 The substrates must not be used as a seed crystal.
3 The specifications are subject to change without notice.

Novel Crystal Technology, Inc.