Free-standing GaN S	ubstrates 1010			
Item	GaN-FR-U-1010	GaN-FR-N-1010	GaN-FR-SI-1010	
Dimension	10 x 10.5 mm ² , Customed Size			
Thickness	$350 \pm 25 \mu m$			
Orientation	C plane (0001) off ang	ele toward M-axis 0.35 ±	$ \wedge_{\mathbf{R}} $	
Conduction Type	N-type	N-type	Semi-Insulating	10 #
Resistivity (300K)	< 0.1 Ω·cm	< 0.05 Ω·cm	$> 10^6 \Omega \cdot \mathrm{cm}$	(1-100) Ga face In m
TTV	≤ 10 μm			
BOW	$-10 \ \mu \text{m} \le \text{BOW} \le 10 \ \mu \text{m}$			(11-20)
Ga Face Surface Roughness	< 0.2 nm (polished) or < 0.3 nm (polished and surface treatment for epitaxy)			10.5 ± 0.2 mm
N Face Surface Roughness	$0.5 \sim 1.5 \mu m$ option: 1~3 nm (fine ground); < 0.2 nm (polished)			C plane(0001)
Dislocation Density	From 1 x 10 ⁵ to 3 x 10 ⁶ cm ⁻² (calculated by CL)*			
Useable Area	> 90% (edge exclusion)			
Package	Packaged in a class 100 clean room environment, and under a nitrogen atmosphere.			Notes: The circular arc angle (R < 2 mm) is used for distinguishing the Ga and N face.

^{*}National standards of China (GB/T32282-2015)



Free-standing GaN S	ubstrates 1015				
Item	GaN-FR-U-1015	GaN-FR-N-1015	GaN-FR-SI-1015		
Dimension	10 x 15 mm ² , Customed Size				
Thickness	$400 \pm 25 \ \mu m$				
Orientation	C plane (0001) off angle toward M-axis $0.35 \pm 0.15^{\circ}$				
Conduction Type	N-type	N-type	Semi-Insulating	C/Ga face	a 0±0.5mm
Resistivity (300K)	< 0.1 Ω·cm	< 0.05 Ω·cm	$> 10^6 \Omega$ ·cm	C/Ga Tace	a 7.0±0
TTV	$\leq 10 \ \mu m$				
BOW	$-10 \ \mu\text{m} \le BOW \le 10 \ \mu\text{m}$			m	
Ga Face Surface Roughness	< 0.2 nm (polished) or < 0.3 nm (polished and surface treatment for epitaxy)			15±0.5mm	
N Face Surface Roughness	$0.5 \sim 1.5 \mu m$ option: 1~3 nm (fine ground); < 0.2 nm (polished)				
Dislocation Density	From 1 x 10 ⁵ to 3 x 10 ⁶ cm ⁻² (calculated by CL)*				
Useable Area	> 90% (edge exclusion)			Notes:	
Package	Packaged in a class 100 clean room environment, and under a nitrogen atmosphere.			The circular arc angle (R < 2 mm distinguishing the Ga and N face	*

^{*}National standards of China (GB/T32282-2015)

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Free-standing GaN S	ubstrates 2 inch	ı				
Item	GaN-FR-U-50	GaN-FR-N-50	GaN-FR-SI-50			
Dimension	Φ50.8±1 mm					
Thickness	$400 \pm 25 \ \mu m$					
Orientation	C plane (0001) off	angle toward M-axis 0.35				
Conduction Type	N-type	N-type	Semi-Insulating	C/Ga face		
Resistivity (300K)	< 0.5 Ω·cm	< 0.05 Ω·cm	$> 10^6 \Omega \cdot cm$	Φ50.8±1mm		
TTV	\leq 15 μm			**************************************		
BOW	$-10 \ \mu\text{m} \le BOW \le 10 \ \mu\text{m}$					
Ga Face Surface Roughness	< 0.2 nm (polished) or < 0.3 nm (polished and surface treatment for epitaxy)			m 16±1mm		
N Face Surface Roughness	$0.5 \sim 1.5 \mu m$ option: 1~3 nm (fine ground); < 0.2 nm (polished)					
Dislocation Density	From 1 x 10 ⁵ to 3 x 10 ⁶ cm ⁻² (calculated by CL)*					
Useable Area	> 90% (edge exclusion)			Notes:		
Package	Packaged in a class 100 clean room environment, and under a nitrogen atmosphere.			Useable area: edge and macro defects exclusion		

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Free-standing GaN S	Substrates 4 inch		
Item	GaN-FR-U-100	GaN-FR-N-100	
Dimension	Φ 100 ± 1 mm		
Thickness	$420 \pm 50 \; \mu m$		
Orientation	C plane (0001) off angle t	oward M-axis $0.3 \pm 0.25^{\circ}$	C/Ga face
Conduction Type	N-type N-type		Ф100+1mm
Resistivity (300K)	< 0.5 Ω·cm	< 0.05 Ω·cm	₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩ ₩
TTV	≤ 30 μm		
BOW	-25 μm ≤ BOW ≤ 25 μm		
Ga Face Surface Roughness	< 0.2 nm (polished) or < 0.3 nm (polished and surface treatment for epitaxy)		a 32±1mm
N Face Surface Roughness	$0.5 \sim 1.5 \mu m$ option: 1~3 nm (fine ground); < 0.2 nm (polished)		\ <u>\</u>
Dislocation Density	$< 5 \times 10^6$		
Useable Area	> 90% (edge exclusion)		Notes:
Package	Packaged in a class 100 clean room environment, and under a nitrogen atmosphere.		Useable area: edge and macro defects exclusion

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Free-standing GaN C	composite Substrates 2-4 inch	1		
Item	GaN-FR-U-50S, GaN-FR-U-100S	GaN-FR-N-50S, GaN-FR-N-100S		
Dimension	Φ50±0.5 mm, Φ100±0.5 mm			
Thickness	$4.5 \pm 0.5 \mu m$, Customized	$4.5 \pm 0.5 \mu\text{m}$, Customized		
Substrate Structure	GaN on Sapphire (0001)	С/ _{Ga} face Ф50.8±0.5mm		
Orientation	C plane (0001) off angle toward M-a			
Conduction Type	N-type N-type			
Resistivity (300K)	$< 0.5 \ \Omega \cdot \text{cm}$ $< 0.05 \ \Omega \cdot \text{cm}$			
TTV	≤ 30 μm		m 16±1mm	
BOW	$-25 \mu \text{m} \leq \text{BOW} \leq 25 \mu \text{m}$			
Ga Face Surface Roughness	< 0.2 nm (polished) or < 0.3 nm (polished and surface tre			
N Face Surface Roughness	$0.5 \sim 1.5 \mu m$ option: 1~3 nm (fine ground); < 0.2 r			
Dislocation Density	$< 5 \times 10^8$			
Useable Area	> 90% (edge exclusion)	Notes:		
Package	Packaged in a class 100 clean room enitrogen atmosphere.	Useable area: edge and macro defects exclusion		

^{*}National standards of China (GB/T32282-2015)