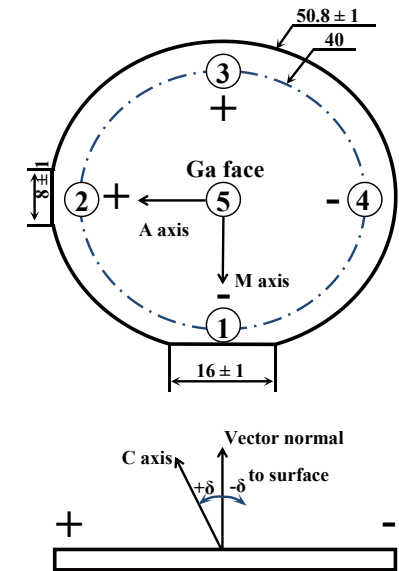


# GaN 2" Free-standing Undope Wafer

2-inch Free-standing U-GaN Substrates						
	Excellent level (S)		Production level (A)		Research level (B)	Dummy level (C)
	S-1	S-2	A-1	A-2		
Dimension	50.8 ± 1 mm					
Thickness	350 ± 25 μm					
Orientation flat	(1-100) ± 0.5°, 16 ± 1 mm					
Secondary orientation flat	(11-20) ± 3°, 8 ± 1 mm					
Resistivity (300K)	< 0.5 Ω·cm for N-type (Undoped; GaN-FS-C-U-C50)					
TTV	≤ 15 μm					
BOW	≤ 20 μm					≤ 40 μm
Ga face surface roughness	< 0.2 nm (polished) or < 0.3 nm (polished and surface treatment for epitaxy)					
N face surface roughness	0.5 ~ 1.5 μm option: 1~3 nm (fine ground); < 0.2 nm (polished)					
Package	Packaged in a cleanroom in single wafer container					
Useable area	> 90%				> 80%	> 70%
Dislocation density	< 9.9x10 <sup>5</sup> cm <sup>-2</sup>	< 3x10 <sup>6</sup> cm <sup>-2</sup>	< 9.9x10 <sup>5</sup> cm <sup>-2</sup>	< 3x10 <sup>6</sup> cm <sup>-2</sup>	< 3x10 <sup>6</sup> cm <sup>-2</sup>	
Orientation: C plane (0001) off angle toward M-axis	0.35 ± 0.15° (3 points)		0.35 ± 0.15° (3 points)		0.35 ± 0.15° (3 points)	
Macro defect density (hole)	0 cm <sup>-2</sup>		< 0.3 cm <sup>-2</sup>		< 1 cm <sup>-2</sup>	
Max size of macro defects			< 700 μm		< 2000 μm	< 4000 μm



Note:  
 (1) Useable area: edge and macro defects exclusion  
 (2) 3 points: the miscut angles of positions (2, 4, 5) are 0.35 ± 0.15°