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-SinoGaN-

Beijing SinoGaN Semiconductor Technology Co., Ltd. is a leading high-tech enterprise that specializes in the research and development, production, and OEM service of nitride wide band gap semiconductor epiwafers. With a top-notch technology and management team, SinoGaN has established a comprehensive system for technological innovation and product quality management. Our goal is to become a renowned enterprise in the field of AlGaN-based deep UV LED epiwafers and Si-based GaN semiconductor epiwafers, consistently meeting the demands of industry customers and the market with advanced technology and high-quality products.

Located in the third-generation semiconductor industrial park in Beijing's Shunyi District, SinoGaN has constructed state-of-the-art ultra-clean plants with 10,000, 1,000, and 100 class cleanroom facilities. These facilities are equipped with high-temperature MOCVD for deep UV LED epitaxy, MOCVD for large-size Si-based GaN epitaxy, as well as various semiconductor analysis and testing equipment.

At SinoGaN, we possess multiple independent intellectual property rights and patented technologies in the field of deep UV LED, Si-based GaN electronic materials. Our expertise covers all aspects of the industrial chain, from epitaxial growth to chip preparation. We offer a wide range of full-band UV-LED epiwafers, including UVA, UVB, UVC, as well as GaN-on-Si epiwafers for power electronics and RF electronic devices. Additionally, we provide customized epitaxial wafer solutions to cater to specific requirements.

Beijing SinoGaN Semiconductor Technology Co., Ltd

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We are pleased to inform you that Beijing SinoGaN Semiconductor Technology Co., Ltd offers customized GaN epitaxial wafers. Our GaN epitaxial wafers are specifically tailored to meet your unique requirements and specifications. Please refer to the following customized GaN epitaxial wafer structures and parameters:

(1)

- in-situ SiN 20nm
- $Al_{0.25}Ga_{0.75}N$ 25nm
- AlN 1nm
- GaN 150nm
- C:GaN 500nm
- $Al_{0.25}Ga_{0.75}N$ 500nm
- $Al_{0.50}Ga_{0.50}N$ 250nm
- $Al_{0.75}Ga_{0.25}N$ 250nm
- AlN
- 8 inch Si(111) 725um

(2)

- SiN 3nm
- Al0.3Ga0.7N 13nm
- AlN 1.5nm
- GaN 400nm
- GaN 5.5um
- AlN 15nm
- GaN 1μm
- Buffer AlN 200nm
- 8" p(B) 10－20Ω.cm Si (111) Substrate

(3)

- SiN passivation 5nm
- Al0.27Ga0.73N barrier layer 10nm
- GaN layer 250nm
- AlGaN buffer 200nm
- 6 inch Si Substrate 1mm

（4）

- Si3N4 passivation 5nm
- Al0.2Ga0.8N Barrier 30nm
- AlN Spacer 1nm
- GaN Channel 50nm
- GaN Buffer 1.5 μm
- HT-AlN Buffer 200nm
- 6” Sapphire Substrate 1000um

（5）

- SiN 5nm
- GaN Cap 20nm
- Al0.27Ga0.73N cap 2.6nm
- GaN Channel 10nm
- AlN 0.7nm
- Al0.38Ga0.62N 10nm
- graded AlxGa1-xN:SiX: 5~38% 20nm
- S.I. GaN Buffer
- 4” Sapphire Substrate 635um

(6)

- SiN layer 50nm
- AlGaN barrier layer 30nm
- GaN 2um
- GaN: C 500nm
- Transition layer 200nm
- 6” or 8” Si substrate 725um

(7)

- SiN Cap 30~50nm
- AlN barrier 7nm
- GaN 150nm
- $Al_{0.05}Ga_{0.95}N$
- $Al_{0.30}Ga_{0.70}N$
- $Al_{0.60}Ga_{0.40}N$
- AlN nucleation
- 4 inch Si(111) Substrate (ρ > 5 KΩ·cm) 780um

(8)

- p-GaN 100nm
- AlGaN 15nm
- GaN 2μm
- AlN 50 nm
- 6" or 8" Silicon(111) 1000um

(9)

- GaN cap 2nm
- $Al_{0.32}Ga_{0.68}N$ 20 nm
- GaN 1.5 μm
- AlN 100nm
- 6" Si (111) substrate HR (>104 Ω cm) 525 μm

(10)

- Si_3N_4 cap layer 5 nm
- AlN barrier 5nm
- GaN channel 0.2um
- AlGaN buffer 0.1um
- 4 inch HR-Si(111) substrate 1000 um

(11)

- SiN 18nm
- $Al_{0.35}Ga_{0.65}N$ barrier 28nm
- GaN Channel 150nm
- AlN buffer 2.5um
- 4” or 6” SiC Substrate 500um

(12)

- SiO2 20nm
- n+GaN contact layer 20nm (Si, 1 × 1019cm−3)
- n-GaN 0.22um (Si, 5×1018cm−3)
- p-GaN 0.4um (Mg, 3×1019cm−3)
- n- drift 2um (Si, 1×1017cm−3)
- n+ drain 0.5um (Si, 1×1019cm−3)
- AlN nucleation layer 60nm
- 4” 4H SiC substrate 500um

Quality Control Criteria:

Crack: 0 ea/wafer; Particle: <1000ea/wafer;
Total thickness Uniformity: <3%; BOW: 0±30 um;
GaN(002)FWHM:<700arcsec; GaN(102)FWHM:<1300arcsec;
Uniformity<3%; Mobility >1700 cm2/V-s; Sheet resistance <600 Ohm/sq;
Vertical leakage @650V <1E-6A/cm2; Sheet carrier density >7 E12*cm-2.

In the following pages, we will showcase SinoGaN's standard GaN epitaxial wafer products.

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GaN/Si Epiwafers P/N: EMR6/26G-4/6/8

Features Overview

- High uniformity and good repeatability
- Low RF loss
- "4", and "6" available

Typical Applications

- 5G and 6G wireless communications
- Solid-state RF energy application

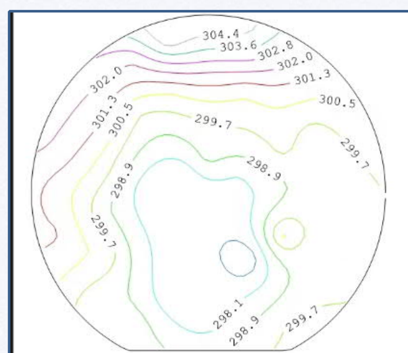
Wafer Size and Epi-Structure

Epi-Structure
GaN cap layer
AlGaN barrier
AlN interlayer
GaN channel
HR-GaN buffers (C)
AlN
HR-Si (111) substrate

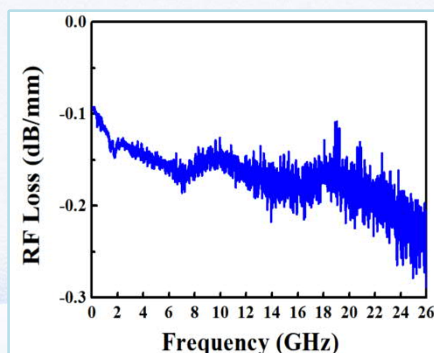
Specification	Values
Diameter	4/6 inch
Epi thickness	～2 μm
Bowing	≤20 μm
Sheet resistance	≤320 Ω/☐
RF Loss	≤ 0.3dB/mm@26GHz

Item	Criteria	Typical	Uniformity	Condition	Standard
Crystal Quality of GaN buffer (arcsec)					
XRC FWHM(002)	≤450	430		XRD	
XRC FWHM(102)	≤550	495		XRD	
2DEG transport properties					
Mobility	≥1800	1900		Hall	
Concentration	≥9E12	1E13		Hall	
R_{sh}	≤350	320		Hall	
Wafer Profile and Surface characteristics					
Wafer Bow	≤20	≤15		PL	
Total Defect					
Edge Crack	≤3 mm	1mm			
Scratch	No	No			
RMS @5x5 μm^2	≤0.5 nm	0.3 nm		AFM	

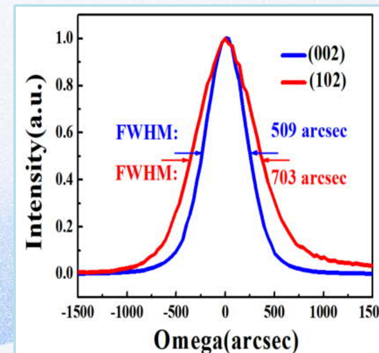
Typical Characteristics Datasheet



Wafer uniformity value(%) 1.09



RF Loss



XRD

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GaN/Si Epiwafers P/N: EMP650-4/6/8D

Features Overview

- High uniformity and good repeatability
- Low leakage current with excellent 2DEG transport properties
- Breakdown voltage ≥ 650 V
- 4″, 6″ and 8″ available
- RoHS compliant

Typical Applications

- Suitable for power HEMTs and low cost CMOS process,
- Suitable for power diodes

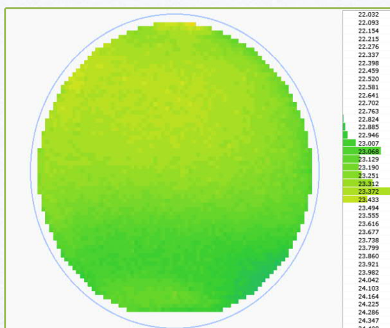
Wafer Size and Epi-Structure

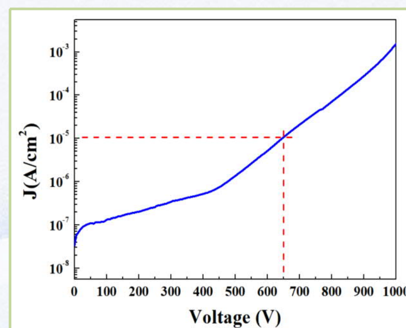
Epi-Structure
GaN cap layer
AlGaN barrier
AlN interlayer
GaN channel
HV buffer
AlN
Si(111)substrate

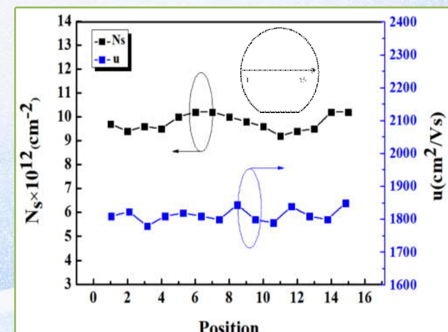
Specification	Values
Diameter	4/6/8 inch
Epi thickness	～5.5 μm
Bowing	≤30 μm
Sheet resistance	≤450 Ω/☐
Leakage current	≤ 1 E-5A/cm^2 @650V

Item	Criteria	Typical	Uniformity	Condition	Standard
Buffer vertical leakage	≤1 E-5A/cm^2 @650V	1E-5A/cm^2 @650V			
Buffer lateral leakage	≤50 nA/mm @650V	20 nA/mm @650V			
XRC FWHM(002)	≤800	650		XRD	
XRC FWHM(102)	≤1300	1250		XRD	
2DEG transport properties					
Mobility	≥1600	1800		Hall	
Concentration	≥8E12	9E12		Hall	
R_{sh}	≤450	400			
Wafer Profile and Surface characteristics					
Wafer Bow	≤30	≤25		PL	
Total Defect					
Edge Crack	≤3 mm	1mm			
Scratch	No	No			
RMS @5x5 μm^2	≤0.5 nm	0.3 nm		AFM	

Typical Characteristics Datasheet







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GaN/Si Epiwafers P/N: EMP650-4/6/8E

Features Overview

- High uniformity and good repeatability
- Low leakage current with excellent 2DEG transport properties
- Breakdown voltage ≥ 650 V
- 4″, 6″ and 8″ available
- RoHS compliant
- P-GaN

Typical Applications

- Suitable for power E-mode HEMTs and low cost CMOS process,
- Suitable for power diodes

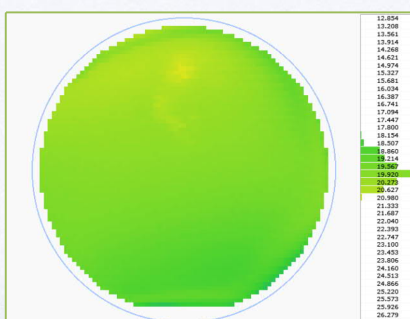
Wafer Size and Epi-Structure

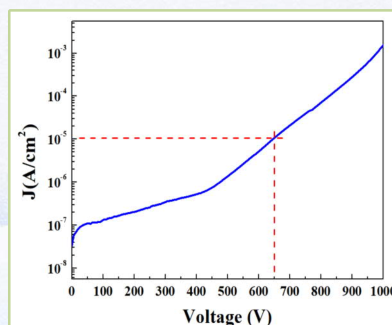
Epi-structure
PGaN
AlGaN barrier
AlN interlayer
GaN channel
HV buffers
AlN
Si (111) substrate

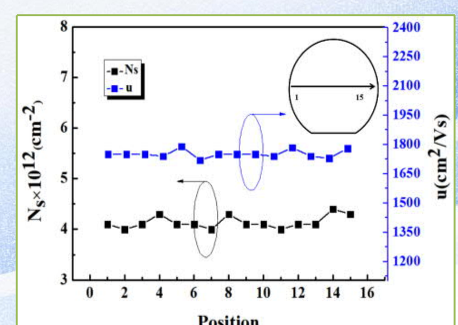
Specification	Values
Diameter	4/6/8 inch
Epi thickness	～5.5 μm
Bowing	≤30 μm
Threshold voltage	1.5V
Leakage current	≤ 1 E-5A/cm^2 @650V

Item	Criteria	Typical	Uniformity	Condition	Standard
Buffer vertical leakage	≤1 E-5A/cm^2 @650V	5E-6A/cm^2 @650V			
Crystal Quality of GaN buffer (arcsec)					
XRC FWHM(002)	≤800	650		XRD	
XRC FWHM(102)	≤1300	1250		XRD	
2DEG transport properties					
Mobility	≥1700	1700		Hall	
Concentration	≥4E12	4.5E12		Hall	
Threshold voltage	1.5V	1.5V			
Concentration of p-GaN	≥2E17/cm^3	2.2E17/cm^3		Hall	
Wafer Profile and Surface characteristics					
Wafer Bow	≤30	≤25		PL	
Total Defect					
Edge Crack	≤3 mm	1mm			
Scratch	No	No			
RMS @5x5 μm^2	≤0.5 nm	0.3 nm		AFM	

Typical Characteristics Datasheet







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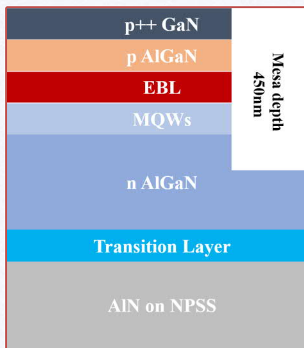
UVC Epiwafers P/N:UVE275-2/4

Features Overview

- High uniformity and good repeatability
- Based on NPSS or AlN template

Wafer Size and Epi-Structure



Parameters	Specification
Wafer size	2 inch
Total thickness	～4 μm
XRC of AlN template	（002）：≤150 arcsec, （102）：～350 arcsec
Concentration of n-AlGaN	～1.5 E19/cm^3

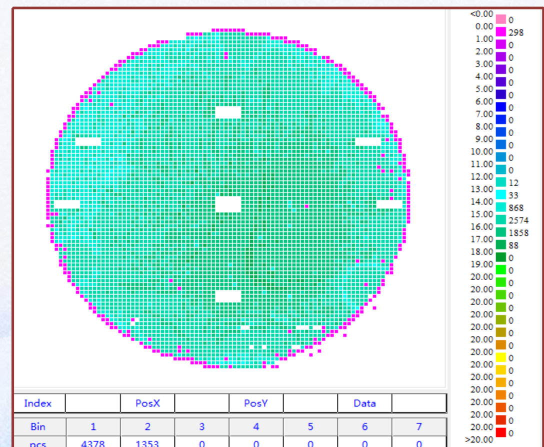
Optical Characteristics

Parameters	Symbol	Condition	Unit.	Min.	Typ.	Max.	Remarks
Output Power	P_o	2020@100 mA	mW	13	15	17	
Wavelength	W_p		nm	270	275	280	
FWHM of PL peak	W_h		nm	-	10	11	
Forward Voltage	V_f		V	5.2	5.3	5.5	

Surface Defects

No.	Parameters	Criteria	Condition
1	Edge exclusion	≤ 3 mm	-
2	Crack	≤ 50	-
3	Haze	None	-
4	Hillock	≤100 ea@1mm^2, 50 x optical microscope	-
5	Scratch	None	-
6	Contamination	None	-
7	Bowing	≤ 110 μ m	

Typical Characteristics Datasheet



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