

000S06EP01

6" AlGaIn/GaN EPI-WAFERS on Si-Sub

GALLIUM NITRIDE GaN on Si EPI-WAFERS

High uniformity

Sophisticated buffer layer for low leakage current

Perfect base for high electron mobility transistors (HEMT)

Excellent 2DEG characteristic

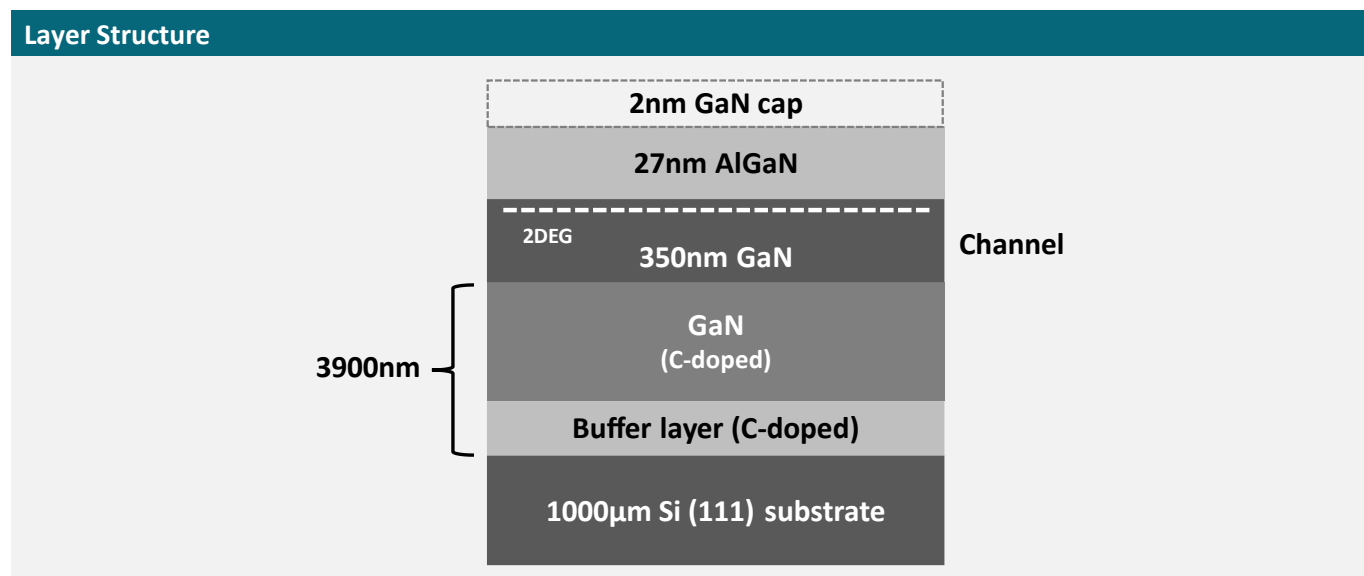
High breakdown voltage with 650V

SUBSTRATE SPECIFICATION




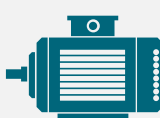




Item		Characteristics
Substrate		6 inch p-type low resistivity Si substrate
Wafer Diameter		150.0 ± 0.5mm
Thickness		1000 ± 25μm
Orientation		(111) just ± 0° 20'
Orientation Flat	Orientation	(110) just ± 1° 0'
	Length	57.5 ± 2.5mm
Surface Finishing		One-side polished

TYPICAL HEMT STRUCTURE ON Si SUBSTRATE



APPLICATIONS

Battery Chargers	Data Storage Systems	Electric Mobility	Motor Drives	Renewable Energy	SMPS
					

EPITAXIAL LAYER STRUCTURE

Layer	Material	Al Composition	Thickness (nm)	Dopant	Doping (cm ⁻³)
5	i-GaN	-	2	-	-
4	i-AlGaN	0.25	27	-	-
3	i-GaN	-	350	-	-
2	i-GaN (C-doped)	-	~ 3900	(C)	Note 1
1	Buffer layer (C-doped)	-			
Substrate	Si				

Note:

1: GPT standard high resistivity condition. Growth method: MOCVD

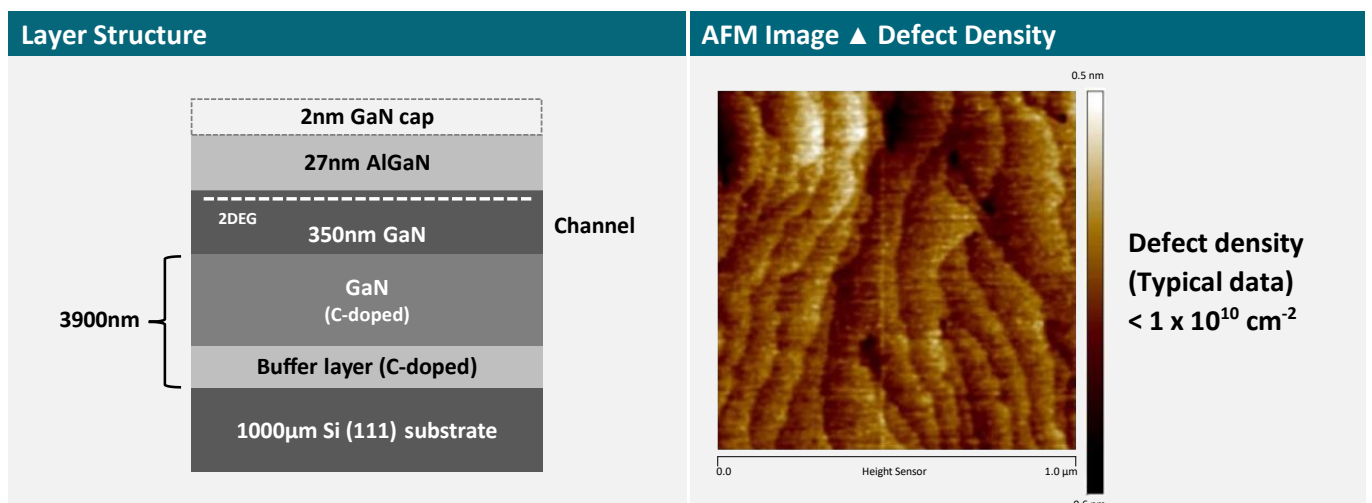
EPITAXIAL WAFER SPECIFICATION

Item	Specification		Comments
Barrier layer thickness (nm)	Designed ± 10%	XRD	3 points Calibration EPI ²
Barrier layer Al composition	Designed ± 0.02	XRD	3 points Calibration EPI ²
FWHM (0002) (arcsec)	≤ 1000	XRD	Center For each wafer
FWHM (10-12) (arcsec)	≤ 1800	XRD	Center For each wafer
Total EPI thickness (nm)	Average Designed ± 10%	Optical interferometer	Whole surface For each wafer
Wafer bowing (μm)	- 50μm ≤ Bow ≤ 50	FRT method	Whole surface For each wafer
Surface particle number (Surfscan)	Total: ~ 500 [Reference]	Surfscan	Whole surface For each wafer

Note:

2: GPT standard high resistivity condition. Growth method: MOCVD

TYPICAL ATOMIC FORCE MICROSCOPY (AFM) IMAGE



TYPICAL CHARACTERISTICS OF HEMT ON Si

Item	Performance
Sheet Resistance	350 ~ 450 Ω /sq
Electron Mobility	> 1500 cm^2/Vs
Sheet Carrier Density	$8 \times 10^{12} \text{ cm}^{-2}$
XRD-FWHM (0002)	~ 1000 arcsec
XRD-FWHM (10-12)	~ 1800 arcsec
Vertical Breakdown Voltage	$\geq 650 \text{ V}$

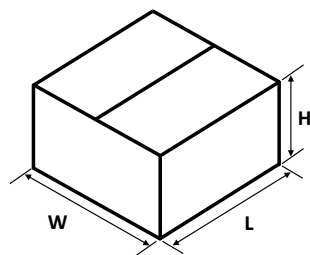
6 INCH Si SUBSTRATE

Item	Characteristics
Material	Si
Orientation	(111) just $\pm 0^\circ 20'$
Wafer Diameter	$150 \pm 0.5 \text{ mm}$
Thickness	$1000 \pm 25 \mu\text{m}$
Orientation Flat	(110) $\pm 1^\circ 0'$
Length	$57.5 \pm 2.5 \text{ mm}$
Surface Finishing	One-side polished
Resistivity	$0.01 \sim 0.025 \Omega\text{cm}$

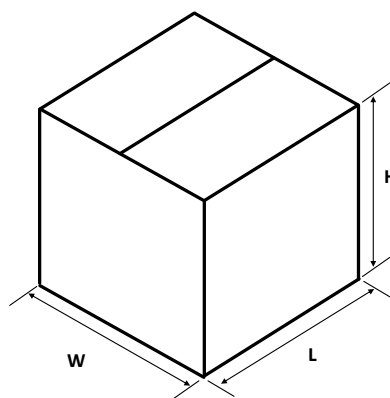
ORDERING INFORMATION AND PACKAGING

Part Number	Quantity (pcs) Wafer / Inner Box	Quantity Inner Box (pcs)	L x W x H (mm) Inner Box	Quantity (pcs) Wafer / Outer Carton	L x W x H (mm) Outer Carton
000S06EP01-12	3	4	230 x 160 x 180	12	385 x 320 x 475
000S06EP01-18	3	6	230 x 160 x 180	18	565 x 320 x 475

Inner Box



Outer Carton



Each wafer packed in cassette and vacuum bag.

CONFIRMATION TABLE

Items to be confirmed

- The structure of nucleation layer is based on GPT standard specification.
- The total thickness of epi wafer will be evaluated using optical interferometer.
- The composition and layer thickness of AlGaIn barrier layer shall be tuned based on the x-ray diffraction measurement result of the evaluation wafer prior to the growth of the actual wafers. The Al composition and the layer thickness of the barrier layer will be configured based on the spectrum fitting results obtained from the x-ray diffraction measurement results.
- No visible cracks on the wafer surface.
- The wafer margin of 5mm from the edge is excluded for the guaranteed specifications listed above.
- The device characteristics using the delivered wafers are not guaranteed.
- Attached documents are
 - Delivered epi wafer list
 - Total thickness data (for each wafer)
 - Evaluated values of the barrier layer composition and thickness by X-ray diffraction curve fitting (3 points, "calibration epi")
 - XRD-FWHM [(0002) and (10-12)] (center, for each wafer)
 - Wafer bowing (for each wafer)

REVISION TABLE

Revision	Date	Status	Notes
001	29/03/2022	Initial release	Initial publication

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