



**kyyma**<sup>®</sup>  
technologies

# Bulk GaN Substrates



[www.kymatech.com](http://www.kymatech.com)

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## Overview

Kyma's bulk GaN is the cumulation of 20 years of research, development, partnership, and innovation. Using world class HVPE and polishing processes, Kyma's bulk GaN has outstanding crystalline quality, electrical properties, and usable surface area.

Available in 10 mm x 10 mm, 18 mm x 18 mm, 2" and 4" diameters along with excellent prices, Kyma's bulk GaN offers the end user a commercially-viable GaN substrate.



## General Specs

	N-type	Semi-Insulating
<b>Resistivity</b>	$\leq 0.02 \Omega \text{ cm}$	$> 1E8 \Omega \text{ cm}$
<b>Dislocation Density</b>	$< 1E6 \text{ cm}^{-2}$	
<b>XRD Linewidths</b>	002 Reflection: $< 100 \text{ arcsec}$ 102 Reflection: $< 100 \text{ arcsec}$	
<b>Impurities</b>	Hydrogen: $< 3E17$ Carbon: $< 2E16$ Oxygen: $< 7E16$	Hydrogen: $< 3E17$ Oxygen: $< 7E16$
<b>Polarities</b>	Ga-face: standard N-Face: optional	

## Thickness

	10 mm x 10 mm	2"	4"
<b>Diameter</b>	Square	$50.8 \pm 0.3 \text{ mm}$	$100 \text{ mm} \pm 0.3 \text{ mm}$
<b>Thickness</b>	$400 \mu\text{m} \pm 30 \mu\text{m}$	$400 \mu\text{m} \pm 30 \mu\text{m}$	$450 \mu\text{m} \pm 30 \mu\text{m}$
<b>TTV</b>	Not Measured	$\leq 20 \mu\text{m}$	$\leq 40 \mu\text{m}$
<b>Warp</b>	Not Measured	$\leq 30 \mu\text{m}$	$\leq 80 \mu\text{m}$

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## Pitting

- ☐ Every wafer is inspected for pitting and measured for pit density (#/cm<sup>2</sup>). They are then classified into two categories

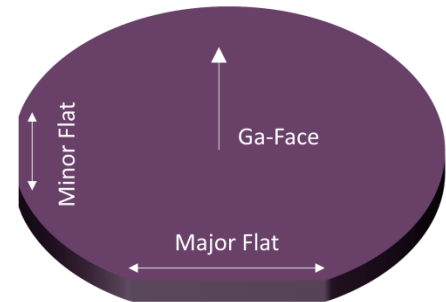
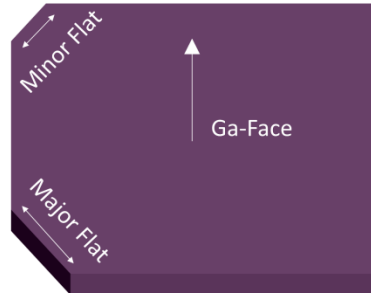
Pit Density	#/cm <sup>2</sup>
Production Grade	≤ 0.5
Research Grade	≤ 1.5

	10 mm x 10 mm	2"	4"
Production Grade	≤ 1	≤ 10	≤ 40
Research Grade	≤ 2	≤ 30	≤ 120

## Surface

Polarity	Front Side	Back Side
Ga-Face	RMS < 1.0 nm	RMS < 3.0 nm
N-Face		

## Orientation



	10 mm x 10 mm	2"	4"
Major Flat Length	N/A	16 mm	32 mm
Minor Flat Length	N/A	8 mm	8 mm

\* All measurements are ± 1 mm

Orientation	(0001) Ga-Face, c-plane (standard); (000-1) N-face (optional)
Offcut Toward m-plane	0.6° ± 0.15° toward [10-10]
Offcut Toward Orthogonal a-plane	0.0° ± 0.15° toward [1-210]
Major Orientation Flat Plane	(10-10) m-plane ± 2° (standard); ± 0.1° (Optional)

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