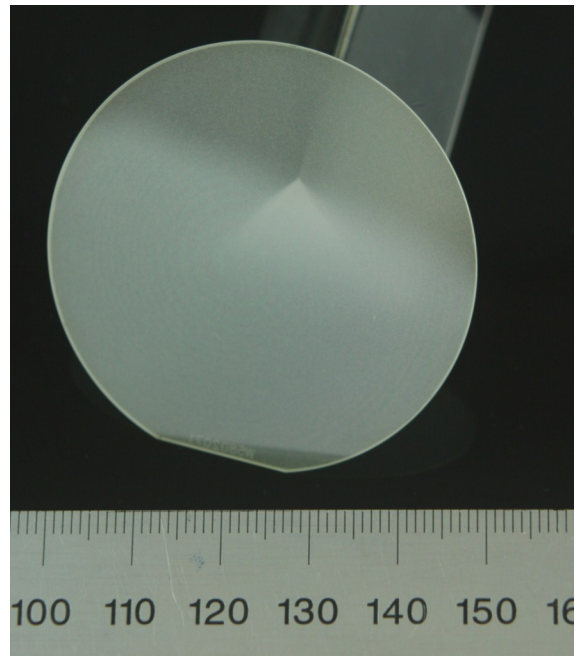




GaN Templates on Sapphire

Kyma Gallium Nitride (GaN) templates grown by HVPE provide a high purity GaN buffer for subsequent device epitaxy. HVPE based templates have several advantages over MOCVD growth:

- Dramatic increase in MOCVD throughput by eliminating the following steps:
 - Sapphire pre-treatment
 - Nucleation layer growth
 - GaN buffer growth
- High purity source material produces higher purity epitaxy
- Lower cost in high volume due to HVPE high growth rates



* 2" single-side polished (SSP) GaN template shown above

Conduction Type	Si-doped (N+)	Undoped (N-)	P-type	Semi-Insulating
Carrier Concentration	$>1 \times 10^{18} / \text{cm}^3$	$>5 \times 10^{17} / \text{cm}^3$	$>5 \times 10^{17} / \text{cm}^3$	Not Applicable
Dislocation Density (5um)	$<1 \times 10^9 / \text{cm}^2$	$<1 \times 10^9 / \text{cm}^2$	$<1 \times 10^9 / \text{cm}^2$	$<1 \times 10^9 / \text{cm}^2$
Resistivity	$<0.05 \text{ Ohm-cm}$	$<5 \text{ Ohm-cm}$	$<0.5 \text{ Ohm-cm}$	$>1 \times 10^6 \text{ Ohm-cm}$
Front Surface Finish	As-grown	As-grown	As-grown	As-grown
Orientation	c-axis (00.1) $\pm 1.0^\circ$	c-axis (00.1) $\pm 1.0^\circ$	c-axis (00.1) $\pm 1.0^\circ$	c-axis (00.1) $\pm 1.0^\circ$
Available Sizes	2"-4"	2"-4"	2"-4"	2"
Available Thicknesses	500nm-5um	500nm-5um	1-5um	500nm-5um

5um GaN Template Specifications:	Production	Research	Rider
Macro Defect Density:	$\leq 5 \text{ cm}^{-2}$	$\leq 10 \text{ cm}^{-2}$	$>10 \text{ cm}^{-2}$
Useable Surface Area:	$\geq 90\%$	$\geq 80\%$	$<80\%$
Surface Finish	As grown	As grown	As grown

*Other thickness options available upon request
Sapphire options available: single side polish, double side polish*