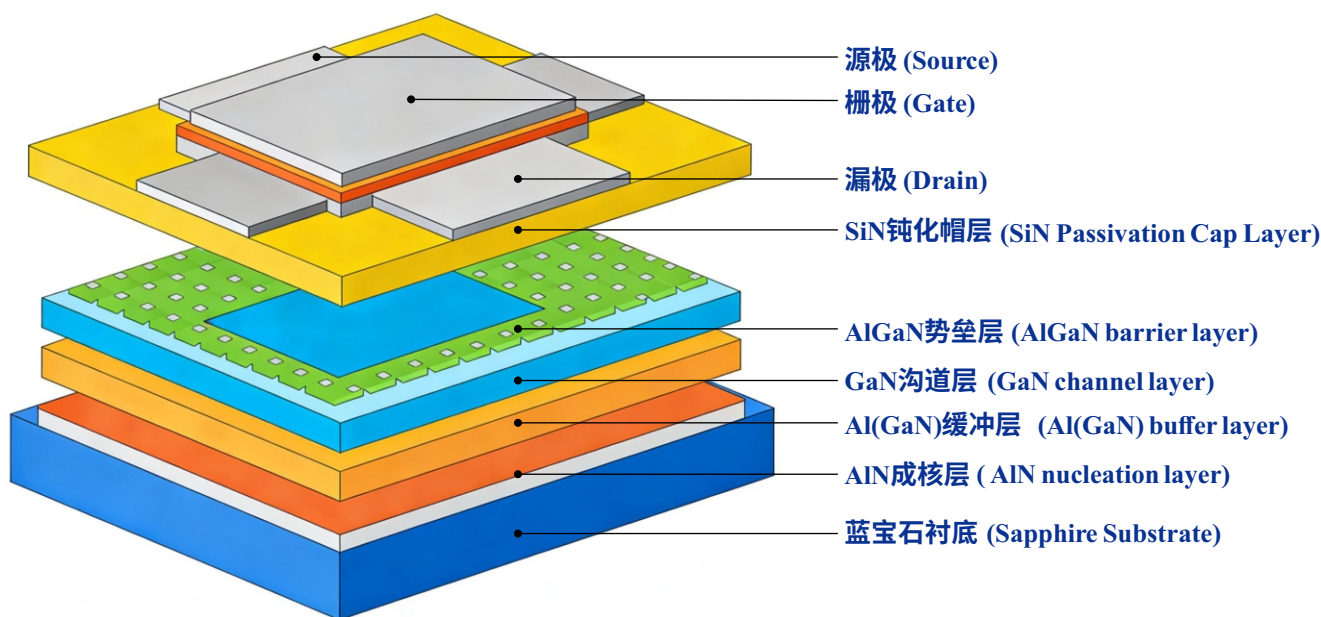


GaN 功率器件用蓝宝石衬底

Sapphire Substrate for GaN Power Device

突破功率器件性能极限·高可靠外延与器件制造核心基底

Breakthrough in Performance Limits of Power Devices • Core Substrate for Highly Reliable Epitaxy and Device Manufacturing



高绝缘 | 低寄生 | 高耐压 | 与 GaN 完美匹配

—— 为 650V-8KV 中高压 GaN HEMT / 功率开关量身打造

High Insulation | Low Parasitics | Medium & High Voltage Endurance | Perfectly Matched with GaN

—— Tailored for 650V-8KV High-Voltage GaN HEMTs / Power Switches

GaN 功率器件的理想衬底选择——蓝宝石

The Ideal Substrate Choice for GaN Power Devices—Sapphire

低热失配 | Low thermal mismatch

与传统衬底相比,蓝宝石衬底与GaN之间的晶格失配(16%)和热膨胀系数失配(-34%)更低,可以简化GaN HEMT缓冲层设计(厚度可减少60%以上),从而可以降低外延成本。

Compared with traditional substrates, sapphire substrate has lower lattice mismatch (16%) and thermal expansion coefficient mismatch (-34%) with GaN, which simplifies the buffer layer design of GaN HEMTs (thickness can be reduced by more than 60%), thus reducing epitaxy cost.

高绝缘性能 | High Insulation Property

蓝宝石衬底具有极高的电阻率($> 10^{11} \Omega \cdot \text{cm}$),表现出优异的绝缘性能,能够有效阻断漏电流,满足车载及工业高压场景的严苛要求。相较于传统衬底,蓝宝石在高压应用中更具安全性。

Sapphire substrate has extremely high resistivity ($>10^{11}\Omega \cdot \text{cm}$), exhibiting excellent insulation performance, effectively blocking leakage current, and meeting the stringent requirements of automotive and industrial high-voltage applications. Compared with traditional substrates, sapphire offers greater safety in high-voltage applications.

高机械强度 | High Mechanical Strength

超高机械强度,杨氏模量为345~420GPa,机械强度高。在制程中能有效抑制晶圆变形和翘曲,提升外延生长的均匀性和良率。

Ultra-high mechanical strength, Young's modulus of 345~420GPa. It effectively suppresses wafer deformation and warpage during the process, improving the uniformity and yield of epitaxial growth.

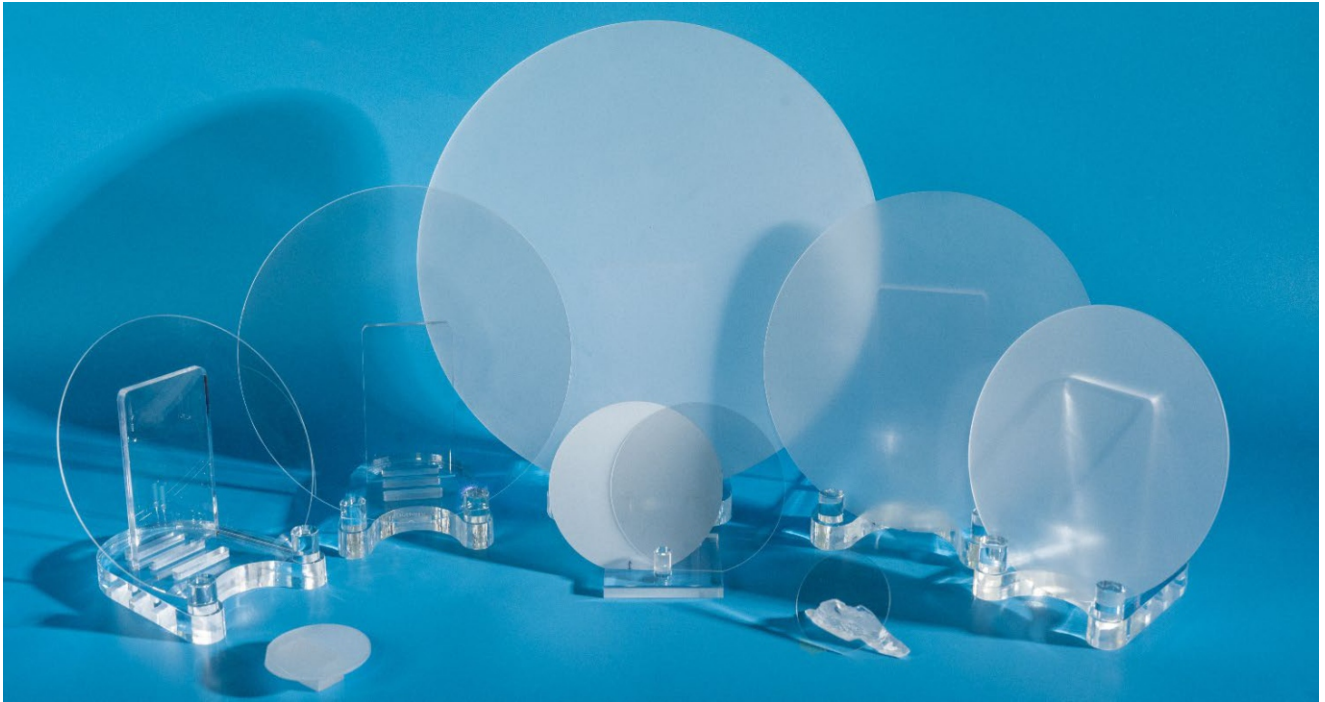
低介电常数 | Low Dielectric Constant

介电常数约为9.5,远低于传统衬底。这一特性有助于降低器件的寄生电容,从而减少开关损耗,完美适配GaN器件的高频工作特性。

Its dielectric constant is approximately 9.5, much lower than that of traditional substrates. This characteristic helps reduce the parasitic capacitance of the device, thereby reducing switching losses, perfectly matching the high-frequency operating characteristics of GaN devices.

GaN 功率器件用蓝宝石衬底规格

Specifications of Sapphire Substrates for GaN Power Devices



性能 Properties	规格 Specification	
	6 inch	8 inch
纯度 Purity	$\geq 99.9998\%$	
直径 Diameter	150.00mm \pm 0.20mm	200.00mm \pm 0.20mm
厚度 Thickness	1000 μ m \pm 20 μ m	1000 μ m \pm 25 μ m
a面(11-20)取向 A-Plane offcut	0 \pm 0.1 $^\circ$	0 $^\circ$ \pm 0.1 $^\circ$
m面(1-100)取向 M-Plane offcut	0.2 $^\circ$ \pm 0.05 $^\circ$	0.2 $^\circ$ \pm 0.05 $^\circ$
定位面方向 orientation notch&Flat	A-plane \pm 0.25 $^\circ$	A-plane \pm 0.25 $^\circ$
正面粗糙度 Frontside Roughness	Ra \leq 0.2nm	Ra \leq 0.2nm
背面粗糙度 Backside Roughness	Ra:0.8 μ m \pm 0.2 μ m	Ra:0.8 μ m \pm 0.2 μ m
倒角面型 Edge Chamfer Type	T-type	T-type
TTV	\leq 10 μ m	\leq 10 μ m
WARP	\leq 15 μ m	\leq 20 μ m
BOW	-15-0 μ m	-20~10 μ m

备注:可根据客户要求定制单抛或双抛产品;针对不同应用可做部分指标优化。

Remarks: Specs can be customized in SSP or DSP according to customer requirements, specific specs can be optimized for different applications.

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天通银厦新材料有限公司

TDG YINXIA NEW MATERIAL CO., LTD

天通银厦新材料有限公司成立于2014年,是天通控股股份有限公司的全资子公司。公司是用改良泡生法制造大尺寸蓝宝石晶体的行业龙头企业,主营蓝宝石晶体、蓝宝石晶棒、蓝宝石衬底的研发、制造和销售,产品主要应用于工业、医药业、集成电路及智能手机终端、新一代MicroLED显示技术和5G通信等行业。

TDG Yinxia New Material Co., Ltd was established in 2014 and is a wholly-owned subsidiary of TDG Holding Co. Ltd. TDG Yinxia is a leading company in the industry that produces large - sized sapphire crystals using the improved KY crystal growth method. Its main business is research and development, manufacturing and sales of sapphire crystals, sapphire ingots and sapphire substrates. Its products are mainly used in industry, pharmaceuticals, integrated circuits, smartphone terminals, new generation Micro LED display technology and 5G communication.

天通银厦新材料有限公司 TDG Yinxia New Material Co., Ltd

地址: 中国宁夏回族自治区银川市西夏区宁朔南街208号
Address: No. 208 Ningshuo South Street, Xixia District, Yinchuan, Ningxia, China

吴先生 ✉ wyx@tdgcore.com

☎ +86 135 6736 3627 (WeChat Same number)

邬先生 ✉ wcx@tdgcore.com

☎ +86 182 6730 7540 (WeChat same number)

Ms. Yin ✉ caoxueyin@tdgcore.com

☎ +86 186 9516 0411 (WhatsApp same number)