

Sapphire(α -Al₂O₃) Substrate

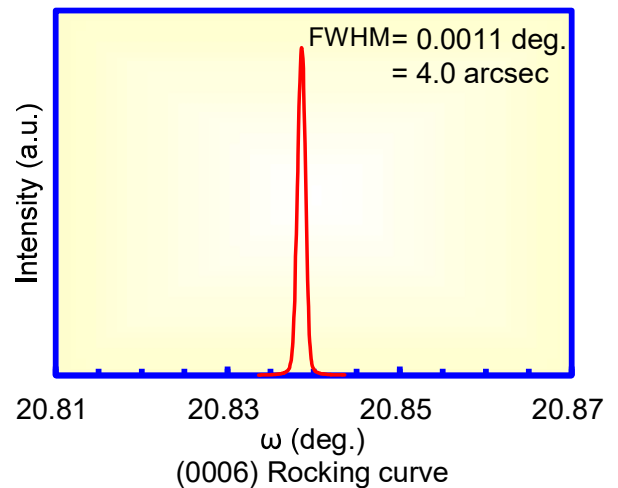
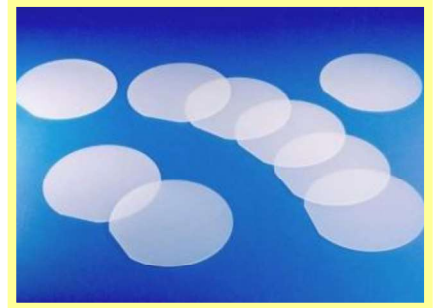
Sapphire is a single crystal of Aluminum oxide(α -Al₂O₃). Shinkosha offers optimal sapphire substrates for epitaxial thin film growth of group-III nitride semiconductors, superconductors and dielectrics. Our sapphire is highly praised around the world for its high quality of crystal, surface processing, cleaning and packaging.

【Features】

- High quality single crystal materials : Few crystal defects
- High quality processing for epitaxial thin-film growth : No affected layer on the surface

【Characteristics】

Crystal system	Trigonal (Rhombohedral)
Crystal structure	Corundum
Space group	$\bar{R}3c$
Lattice constant	a = 0.47588 nm, c = 1.2992 nm (As hexagonal)
Melting point	2040 °C
Density	3.987 g/cm ³
Dielectric constant	(//c axis) 9.41 at 30GHz
Dielectric loss	(//c axis) 3×10^{-5} at 30GHz
Thermal expansion	(at 200 °C, c axis) $7.63 \times 10^{-6} / ^\circ\text{C}$ (at 200 °C, a axis) $6.93 \times 10^{-6} / ^\circ\text{C}$ (at 1000 °C, c axis) $9.97 \times 10^{-6} / ^\circ\text{C}$ (at 1000 °C, a axis) $8.89 \times 10^{-6} / ^\circ\text{C}$



【Standard Specs】

Purity	>99.99%	
Orientation	c(0001), a(11-20), r(01-12), m(10-10)	Tolerance $\pm 0.5^\circ$
Size	10 × 10 mm 15 × 15 mm Tolerance ± 0.1 mm	$\phi 2\text{in}(\phi 50.8\text{mm})$ Tolerance ± 0.25 mm
Thickness	0.5 mm Tolerance ± 0.05 mm	0.33 mm 0.43 mm Tolerance ± 0.05 mm
Polishing	One-side / Both-side	
STEP	Available for : c, a, r	—
Surface roughness	$R_a \leq 1.0$ nm	
Flatness	<1 μm	<16 μm

If you are looking for other specs, please contact us.

All figures in graph and table are typical data (not guaranteed).

Sapphire Model List

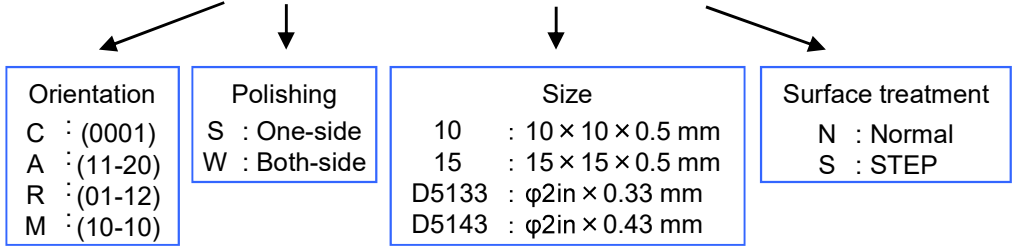
Size (mm)	Polishing	Surface treatment	c-plane (0001)	a-plane (11-20)	r-plane (01-12)	m-plane (10-10)
10x10x0.5	One-side	Normal	○	○	○	○
"	Both-side	"	○	○	○	△
"	One-side	STEP	○	○	△	—
15x15x0.5	One-side	Normal	○	△	△	△
"	Both-side	"	△	△	△	△
"	One-side	STEP	△	△	△	—
φ2in x 0.33	One-side	Normal	○	△	△	△
"	Both-side	"	○	△	△	△
φ2in x 0.43	One-side	"	○	○	○	△
"	Both-side	"	○	○	○	△

○ : Standard △ : Made-to-order

If you are looking for different sizes, offset angle type and others, please contact us.
 *Minimum order for made-to-order model or special model : 5pcs (square shape), 10pcs (round shape)

Model Number

AO — CS — D5143N



Orientation Flat

Substrate Orientation	Orientation Flat
c-plane (0001)	(11-20)
a-plane (11-20)	(0001)
r-plane (01-12)	(11-20)
m-plane (10-10)	(11-20)

<Visual check note>
 We pass over the following:
 (a) Chips within 0.2mm from the circumference of substrates
 (b) Chips on the edge strip under 1/2 size of substrate thickness
 (c) Scratches and blemish on the back side of single-side polished substrates

Square shape

Round shape

