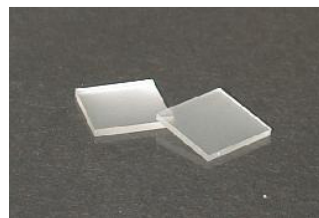


# Sapphire Substrates

## Sapphire (Al<sub>2</sub>O<sub>3</sub>) Substrates!

- ✦ Aluminum Oxide single crystal substrates
- ✦ Epi-ready
- ✦ Purity > 99.99%
- ✦ Excellent quality, free of any defect
- ✦ A, C, M, and R-planes
- ✦ Surface finish < 5-8Å, epi-side



### List of various Sapphire substrates available

A-plane (1120)		M-plane (1100)	
Size	Polish	Size	Polish
10 x 10 x 0.5mm	One side	10 x 10 x 0.5mm	One side
10 x 10 x 0.5mm	Both sides	10 x 10 x 0.5mm	Both sides
0.5" x 0.5" x 0.5mm	One side	0.5" x 0.5" x 0.5mm	One side
0.5" x 0.5" x 0.5mm	Both sides	0.5" x 0.5" x 0.5mm	Both sides
2" dia x 0.5mm	One side	2" dia x 0.5mm	One side
2" dia x 0.5mm	Both sides	2" dia x 0.5mm	Both sides
C-plane (0001)		R-plane (1102)	
10 x 10 x 0.5mm	One side	10 x 10 x 0.5mm	One side
10 x 10 x 0.5mm	Both sides	10 x 10 x 0.5mm	Both sides
0.5" x 0.5" x 0.5mm	One side	0.5" x 0.5" x 0.5mm	One side
0.5" x 0.5" x 0.5mm	Both sides	0.5" x 0.5" x 0.5mm	Both sides
1" dia x 0.5mm	One side	2" dia x 0.5mm	One side
1" dia x 0.5mm	Both sides	2" dia x 0.5mm	Both sides

Other sizes in C-plane may be available. Minimum quantity may apply.

Typical Properties	
Crystal Structure	Hexagonal a = 4.758 Å c = 12.992 Å
Melting Point	2040°C
Density	3.98 gm/cm <sup>3</sup>
Hardness	9 Mohs
Dielectric Constant	~ 9.4 @ 300K @ A axis ~ 11.58 @ 300K @ C axis
Loss Tangent @ 10GHz	< 2x10 <sup>-5</sup> at A axis , < 5 x10 <sup>-5</sup> at C axis
Coefficient of Thermal Expansion	7.5 x 10 <sup>-6</sup> /°C
Chemical Stability	Insoluble in water, Resistant to most solvents



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