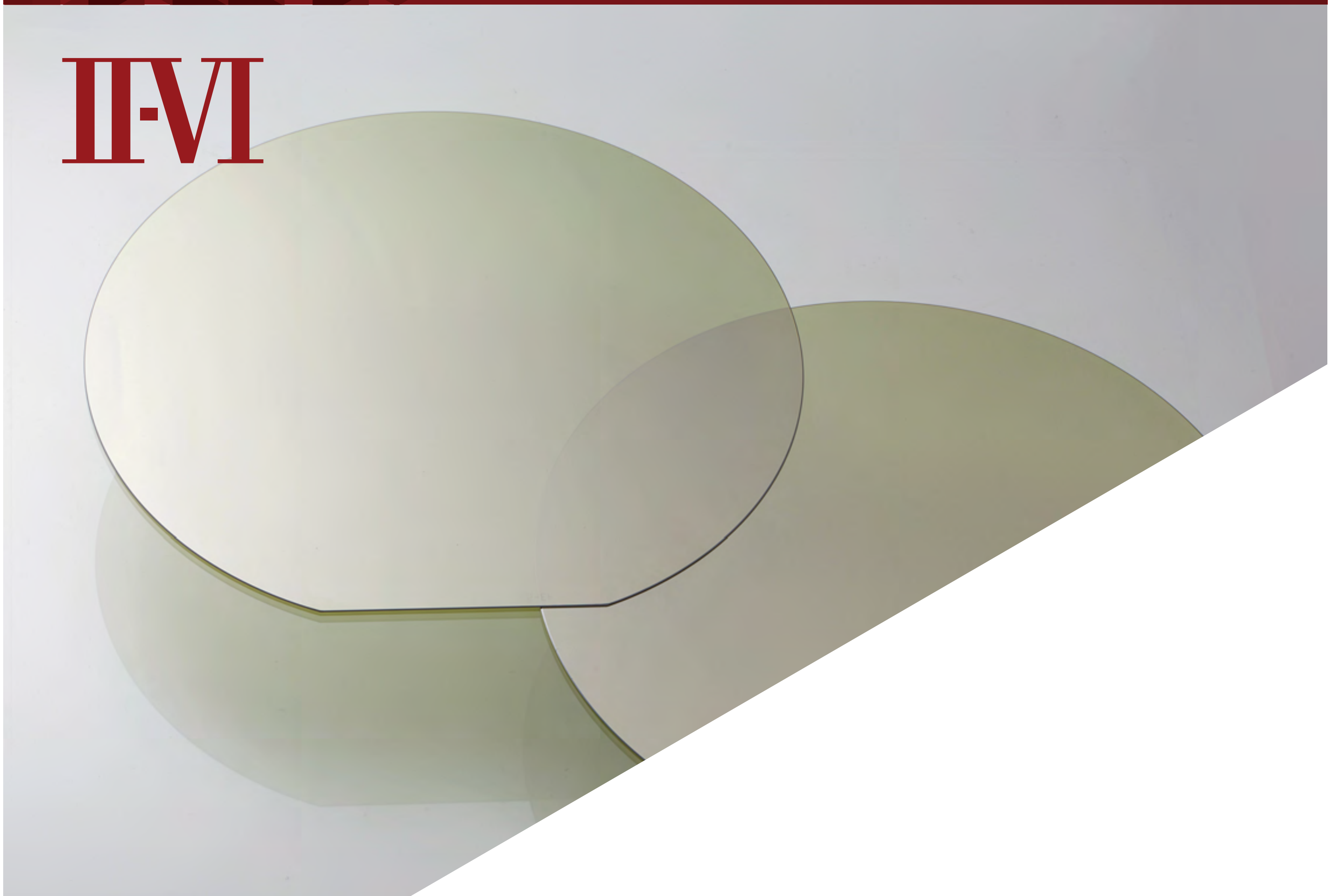
II-VI



SILICON CARBIDE (SiC) SUBSTRATES

The unique electronic and thermal properties of silicon carbide (SiC) make it ideally suited for advanced high power and high frequency semiconductor devices that operate well beyond the capabilities of either silicon or gallium arsenide devices. The key advantages of SiC-based technology include reduced switching losses, higher power density, better heat dissipation and increased bandwidth capability . At the system level, this results in highly compact solutions with vastly improved energy efficiency at reduced cost.
The rapidly growing list of current and projected commercial applications utilizing SiC technologies include switching power supplies, inverters for green (solar and windmill) energy generation, industrial motor drives, HEV and EV vehicles, smart grid power switching and wireless communication base stations .

Silicon Carbide(SiC) Substrates

Growth Method	Physical Vapor Transport

Physical Characteristics

Structure	Hexagonal, Single Crystal
Diameter	Up to 150mm, 200mm under development
Thickness	350μm (n-type, 3" SI), 500μm (SI)
Grades	Prime, Development, Mechanical

Thermal Properties

Thermal Conductivity	370 (W/mK) at Room Temperature
Thermal Expansion Coefficient	4.5 ($10^{-6}K^{-1}$)
Specific Heat (25°C)	0.71 (J/g°C)

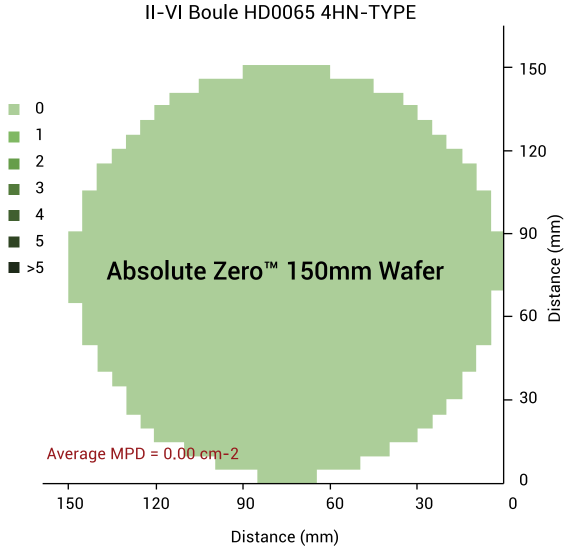
Additional Key Properties of II-VI Advanced Materials SiC Substrates (typical values*)

Parameter	N-type	Semi-insulating
Polytype	4H	4H, 6H
Dopant	Nitrogen	Vanadium
Resistivity	~0.02 Ohm-cm	> 10^{11} Ohm-cm
Orientation	4° off-axis	On-axis
FWHM	< 20 arc-sec	< 25 arc-sec
Roughness, Ra**	<5Å	<5Å
Dislocation density	~ $3{\cdot}10^{3}$ cm $^{-2}$	< 1.10^{4} cm $^{-2}$
Micropipe density	< 0.1 cm $^{-2}$	< 0.1 cm $^{-2}$

* Typical Production Values - Contact Us for Standard Specifications or Custom Requests

** Measured by White Light Interferometry (250 μm x 350μm)

Micropipe Density Distribution Map
II-VI Boule HD0065 4HN-TYPE



Basal Plane Dislocation Density Distribution Map
II-VI Substrate HD0077-16 4H-SiC