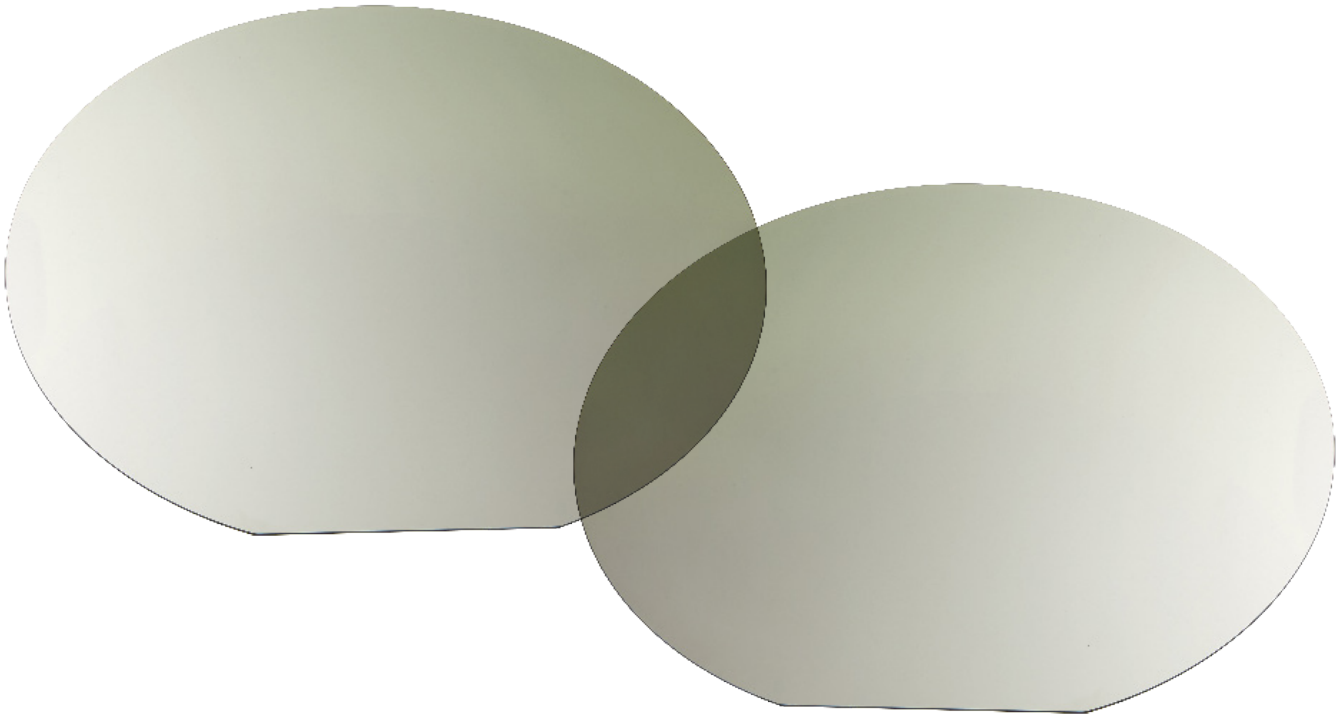
SILICON CARBIDE (SIC) SUBSTRATES

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.



APPLICATIONS

- Switching power supplies
- Inverters for green (solar and windmill) energy generation
- Industrial motor drives
- HEV and EV vehicles
- Smart grid power switching
- Wireless communication 5G base stations
- Radar Applications
- Thermal Management

COHERENT

Growth Method
Physical Vapor Transport

Physical Characteristics

Structure	Hexagonal, Single Crystal
Diameter	Up to 200 mm
Thickness	350 µm (n-type, 76mm SI), 500 µm (100 mm, 150 mm and 200 mm SI)
Grades	Prime, Development, Mechanical

Thermal Properties

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

Additional Key Properties of Coherent SiC Substrates (typical values*)

Parameter	N-type	Semi-insulating
Polytype	4H	6H
Dopant	Nitrogen	Vanadium
Resistivity	~0.02 Ohm-cm	$>10^9$ Ohm-cm
Orientation	4° off-axis	On-axis
Roughness, Ra**	<5Å	<5Å
Dislocation density	~3,000 cm^{-2}	< 10,000 cm^{-2}
Micropipe density	< 0.1 cm^{-2}	< 10 cm^{-2}

* Typical production values - contact us for standard specifications or custom requests
** Measured by white light interferometry (250 µm x 350 µm)

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