PAM-XIAMEN
Xiamen Powerway Advanced Material Co.,Ltd.

SILICON CARBIDE SUBSTRATES

Product Specifications

SiC 6H
SIC 4H

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SILICON CARBIDE MATERIAL PROPERTIES

Polytype	Single Crystal 4H	Single Crystal 6H
Lattice Parameters	a=3.076 Å c=10.053 Å	a=3.073 Å c=15.117 Å
Stacking Sequence	ABCB	ABCACB
Band-gap	3.26 eV	3.03 eV
Density	3.21 · 10^3 kg/m^3	3.21 · 10^3 kg/m3
Therm. Expansion Coefficient	4-5×10^{-6}/K	4-5×10^{-6}/K
Refraction Index	no = 2.719 ne = 2.777	no = 2.707 ne = 2.755
Dielectric Constant	9.6	9.66
Thermal Conductivity	490 W/mK	490 W/mK
Break-Down Electrical Field	2-4 · 10^8 V/m	2-4 · 10^8 V/m
Saturation Drift Velocity	2.0 · 10^5 m/s	2.0 · 10^5 m/s
Electron Mobility	800 cm^2/V • S	400 cm^2/V • S
hole Mobility	115 cm^2/V • S	90 cm^2/V • S
Mohs Hardness	~9	~9

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6H SIC, N-TYPE, 2″ WAFER SPECIFICATION

SUBSTRATE PROPERTY	S6H-51-N-PWAM-250	S6H-51-N-PWAM-330	S6H-51-N-PWAM-430
Description	A/B Production Grade C/D Research Grade D Dummy Grade **6H SiC** Substrate		
Polytype	**6H**		
Diameter	(50.8 ± 0.38) mm		
Thickness	(250 ± 25) μm	(330 ± 25) μm	(430 ± 25) μm
Carrier Type	n-type		
Dopant	Nitrogen		
Resistivity (RT)	0.02 ~ 0.1 Ω • cm		
Surface Roughness	< 0.5 nm (Si-face CMP Epi-ready); <1 nm (C- face Optical polish)		
FWHM	A<30 arcsec	B/C/D <50 arcsec	
Micropipe Density	A+≤1cm^{-2} A≤10cm-2	B≤30cm-2 C≤50cm-2	D≤100cm-2
Surface Orientation			
On axis	<0001>± 0.5°		
Off axis	3.5° toward <11-20>± 0.5°		
Primary flat orientation	Parallel {1-100} ± 5°		
Primary flat length	16.00 ± 1.70 mm		
Secondary flat orientation	Si-face:90° cw. from orientation flat ± 5° C-face:90° ccw. from orientation flat ± 5°		
Secondary flat length	8.00 ± 1.70 mm		
Surface Finish	Single or double face polished		
Packaging	Single wafer box or multi wafer box		
Usable area	≥ 90 %		
Edge exclusion	1 mm		

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6H SIC,SEMI-INSULATING , 2″ WAFER SPECIFICATION

SUBSTRATE PROPERTY	S6H-51-SI-PWAM-250	S6H-51-SI-PWAM-330	S6H-51-SI-PWAM-430
Description	A/B Production Grade C/D Research Grade D Dummy Grade 6H SEMI Substrate		
Polytype	**6H**		
Diameter	(50.8 ± 0.38) mm		
Thickness	(250 ± 25) μm	(330 ± 25) μm	(430 ± 25) μm
Resistivity (RT)	>1E5 Ω • cm		
Surface Roughness	< 0.5 nm (Si-face CMP Epi-ready); <1 nm (C- face Optical polish)		
FWHM	A<30 arcsec	B/C/D <50 arcsec	
Micropipe Density	A+≤1cm^{-2}	A≤10cm-2 B≤30cm-2 C≤50cm-2 D≤100cm-2	
Surface Orientation			
On axis	<0001>± 0.5°		
Off axis	3.5° toward <11-20>± 0.5°		
Primary flat orientation	Parallel {1-100} ± 5°		
Primary flat length	16.00 ± 1.70 mm		
Secondary flat orientation	Si-face:90° cw. from orientation flat ± 5° C-face:90° ccw. from orientation flat ± 5°		
Secondary flat length	8.00 ± 1.70 mm		
Surface Finish	Single or double face polished		
Packaging	Single wafer box or multi wafer box		
Usable area	≥ 90 %		
Edge exclusion	1 mm		

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4H SIC,N-TYPE , 3″ WAFER SPECIFICATION

SUBSTRATE PROPERTY	S4H-76-N-PWAM-330	S4H-76-N-PWAM-430
Description	A/B Production Grade C/D Research Grade D Dummy Grade **4H SiC** Substrate	
Polytype	**4H**	
Diameter	(76.2 ± 0.38) mm	
Thickness	(350 ± 25) μm	(430 ± 25) μm
Carrier Type	n-type	
Dopant	Nitrogen	
Resistivity (RT)	0.015 - 0.028Ω • cm	
Surface Roughness	< 0.5 nm (Si-face CMP Epi-ready); <1 nm (C- face Optical polish)	
FWHM	A<30 arcsec	B/C/D <50 arcsec
Micropipe Density	A+≤1cm^{-2} A≤10cm-2 B≤30cm-2 C≤50cm-2 D≤100cm-2	
TTV/Bow /Warp	＜25μm	
Surface Orientation		
On axis	<0001>± 0.5°	
Off axis	4°or 8° toward <11-20>± 0.5°	
Primary flat orientation	<11-20>±5.0°	
Primary flat length	22.22 mm±3.17mm	
Secondary flat orientation	Si-face:90° cw. from orientation flat ± 5° C-face:90° ccw. from orientation flat ± 5°	
Secondary flat length	11.00 ± 1.70 mm	
Surface Finish	Single or double face polished	
Packaging	Single wafer box or multi wafer box	
Scratch	None	
Usable area	≥ 90 %	
Edge exclusion	2mm	

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4H SIC,SEMI-INSULATING, 3″ WAFER SPECIFICATION

SUBSTRATE PROPERTY	S4H-76-N-PWAM-330	S4H-76-N-PWAM-430
Description	A/B Production Grade C/D Research Grade D Dummy Grade **4H SiC** Substrate	
Polytype	**4H**	
Diameter	(76.2 ± 0.38) mm	
Thickness	(350 ± 25) μm	(430 ± 25) μm
Carrier Type	semi-insulating	
Dopant	V	
Resistivity (RT)	>1E5 Ω • cm	
Surface Roughness	< 0.5 nm (Si-face CMP Epi-ready); <1 nm (C- face Optical polish)	
FWHM	A<30 arcsec	B/C/D <50 arcsec
Micropipe Density	A+≤1cm^{-2} A≤10cm-2 B≤30cm-2 C≤50cm-2 D≤100cm-2	
TTV/Bow /Warp	＜25μm	
Surface Orientation		
On axis	<0001>± 0.5°	
Off axis	4°or 8° toward <11-20>± 0.5°	
Primary flat orientation	<11-20>±5.0°	
Primary flat length	22.22 mm±3.17mm	
Secondary flat orientation	Si-face:90° cw. from orientation flat ± 5° C-face:90° ccw. from orientation flat ± 5°	
Secondary flat length	11.00 ± 1.70 mm	
Surface Finish	Single or double face polished	
Packaging	Single wafer box or multi wafer box	
Scratch	None	
Usable area	≥ 90 %	
Edge exclusion	2mm	

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4H SIC,N-TYPE , 4″ WAFER SPECIFICATION

SUBSTRATE PROPERTY	S4H-76-N-PWAM-330	S4H-76-N-PWAM-430
Description	A/B Production Grade C/D Research Grade D Dummy Grade **4H SiC** Substrate	
Polytype	**4H**	
Diameter	(76.2 ± 0.38) mm	
Thickness	(350 ± 25) μm	(430 ± 25) μm
Carrier Type	n-type	
Dopant	Nitrogen	
Resistivity (RT)	0.015 - 0.028Ω • cm	
Surface Roughness	< 0.5 nm (Si-face CMP Epi-ready); <1 nm (C- face Optical polish)	
FWHM	A<30 arcsec	B/C/D <50 arcsec
Micropipe Density	A+≤1cm^{-2} A≤10cm-2 B≤30cm-2 C≤50cm-2 D≤100cm-2	
TTV/Bow /Warp	＜45μm	
Surface Orientation		
On axis	<0001>± 0.5°	
Off axis	4°or 8° toward <11-20>± 0.5°	
Primary flat orientation	<11-20>±5.0°	
Primary flat length	32.50 mm±2.00mm	
Secondary flat orientation	Si-face:90° cw. from orientation flat ± 5° C-face:90° ccw. from orientation flat ± 5°	
Secondary flat length	18.00 ± 2.00 mm	
Surface Finish	Single or double face polished	
Packaging	Single wafer box or multi wafer box	
Scratch	None	
Usable area	≥ 90 %	
Edge exclusion	2mm	

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6H N-type or Semi-insulating SIC,5mm*5mm, 10mm*10mm WAFER SPECIFICATION : Thickness:330μm/430μm
6H N-type or Semi-insulating SIC,15mm*15mm, 20mm*20mm WAFER SPECIFICATION: Thickness:330μm/430μm
4H N-type or semi-insulating SIC,5mm*5mm, 10mm*10mm WAFER SPECIFICATION : Thickness:330μm/430μm
4H N-type or semi-insulating SIC,15mm*15mm, 20mm*20mm WAFER SPECIFICATION: Thickness:330μm/430μm

a-plane SiC Wafer, size: 40mm*10mm,30mm*10mm,20mm*10mm,10mm*10mm,specs below:

6H/4H N type	**Thickness:330μm/430μm or custom**
6H/4H Semi-insulating	**Thickness:330μm/430μm or custom**