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

SILICON CARBIDE SUBSTRATES

Product Specifications

6H SUBSTRATES
4H SUBSTRATES

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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	$3.21 \cdot 10^3$ kg/m^3	3.21 · 103 kg/m3
Therm. Expansion Coefficient	$4\text{-}5 \times 10^{-6}$/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	$2 – 4 \cdot 10^8$ V/m	2 – 4 · 108 V/m
Saturation Drift Velocity	$2.0 \cdot 10^5$ m/s	$2.0 \cdot 10^5$ 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 N-TYPE SIC, 2 ″ WAFER SPECIFICATION

SUBSTRATE PROPERTY	S6H-51-N-PWAM-250	S6H-51-N-PWAM-330	S6H-51-N-PWAM-430
Description	Production 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	<50 arcsec		
Micropipe Density	≤ 30 cm^{-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 ± 1.7) mm		
Secondary flat orientation	Si-face:90° cw. from orientation flat ± 5° C-face:90° ccw. from orientation flat ± 5°		
Secondary flat length	(8 ± 1.7) 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 SEMI-INSULATING SIC, 2″ WAFER SPECIFICATION

SUBSTRATE PROPERTY	S6H-51-SI-PWAM-250	S6H-51-SI-PWAM-330	S6H-51-SI-PWAM-430
Description	Production Grade 6H SEMI Substrate		
Polytype	6H		
Diameter	(50.8 ± 0.38) mm		
Thickness	(250 ± 25) μm	(330 ± 25) μm	(430 ± 25) μm
Resistivity (RT)	90% >1E5 Ω · cm		
Surface Roughness	< 0.5 nm (Si-face CMP Epi-ready); <1 nm (C- face Optical polish)		
FWHM	<50 arcsec		
Micropipe Density	≤ 50 cm^{-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 ± 1.7) mm		
Secondary flat orientation	Si-face:90° cw. from orientation flat ± 5° C-face:90° ccw. from orientation flat ± 5°		
Secondary flat length	(8 ± 1.7) mm		
Surface Finish	Single or double face polished		
Packaging	Single wafer box or multi wafer box		
Usable area	≥ 90 %		
Edge exclusion	1 mm		

6H N-TYPE SIC,5mm*5mm, 10mm*10mm WAFER SPECIFICATION : Thickness:330μm/430μm

6H N-TYPE SIC,15mm*15mm, 20mm*20mm WAFER SPECIFICATION: Thickness:330μm/430μm

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4H N-TYPE SIC, 2 ″ WAFER SPECIFICATION

SUBSTRATE PROPERTY	S4H-51-N-PWAM-330	S4H-51-N-PWAM-430	
Description	Production Grade 4H SiC Substrate		
Polytype	4H		
Diameter	(50.8 ± 0.38) mm		
Thickness	(250 ± 25) μm	(330 ± 25) μm	(430 ± 25) μm
Carrier Type	n-type		
Dopant	Nitrogen		
Resistivity (RT)	0.012 - 0.0028 Ω · cm		
Surface Roughness	< 0.5 nm (Si-face CMP Epi-ready); <1 nm (C- face Optical polish)		
FWHM	<50 arcsec		
Micropipe Density	≤ 30 cm^{-2}		
Surface Orientation			
On axis	<0001>± 0.5°		
Off axis	4°or 8° toward <11-20>± 0.5°		
Primary flat orientation	Parallel {1-100} ± 5°		
Primary flat length	(16 ± 1.7) mm		
Secondary flat orientation	Si-face:90° cw. from orientation flat ± 5° C-face:90° ccw. from orientation flat ± 5°		
Secondary flat length	(8 ± 1.7) mm		
Surface Finish	Single or double face polished		
Packaging	Single wafer box or multi wafer box		
Usable area	≥ 90 %		
Edge exclusion	1 mm		

4H N-TYPE SIC, 3 ″ WAFER SPECIFICATION

SUBSTRATE PROPERTY	S4H-76-N-PWAM-330	S4H-76-N-PWAM-430
Description	Production 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	<50 arcsec	
Micropipe Density	≤ 20 cm^{-2}	
TTV/Bow /Warp	＜25μm	
Surface Orientation On axis Off axis	 <0001>± 0.5° 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 ± 1.7 mm	
Surface Finish	Single or double face polished	
Packaging	Single wafer box or multi wafer box	
Scratch	None	
Usable area	≥ 90 %	
Edge exclusion	2mm	

4H N-TYPE SIC,5mm*5mm, 10mm*10mm WAFER SPECIFICATION : Thickness:330μm/430μm

4H N-TYPE SIC,15mm*15mm, 20mm*20mm WAFER SPECIFICATION: Thickness:330μm/430μm