SILICON CARBIDE

PRODUCT SPECIFICATION

6H SUBSTRATES

4H SUBSTRATES

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ATTENTION

SiCrystal products are designed exclusively for the use in electronic components.

IMPRESSUM

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SILICON CARBIDE MATERIAL PROPERTIES

Property	4H-SiC, Single Crystal	6H-SiC, Single Crystal
Lattice Parameters	a=3.076 Å c=10.053 Å	a=3.073 Å c=15.117 Å
Stacking Sequence	ABAC	ABCACB
Lattice Sites	1 hexagonal (h) 1 cubic (k)	1 hexagonal (h) 2 cubic (k_1, k_2)
Mohs Hardness	≈9	≈9
Density	$3.21 \cdot 10^3$ kg/m^3	$3.21 \cdot 10^3$ kg/m^3
Therm. Expansion Coefficient	$4 – 5 \cdot 10^{-6}$ /K	$4 – 5 \cdot 10^{-6}$ /K
Refraction Index (at λ=467nm)	n_o=2.719 n_e=2.777	n_o=2.707 n_e=2.755
Dielectric Constant	9.7	9.7
Thermal Conductivity	490 W/mK	490 W/mK
Bandgap	3.27 eV	3.02 eV
Break-Down Electrical Field	$2 – 4 \cdot 10^8$ V/m	$2 – 4 \cdot 10^8$ V/m
Saturation Drift Velocity	$2.0 \cdot 10^5$ m/s	$2.0 \cdot 10^5$ m/s

data as reported in Landolt-Börnstein (Springer Verlag) and G.L. Harris (INSPEC)

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GENERAL DEFINITIONS

Article Number

ABCD-e-FG-h-IJ

A – type of substrate
- W bulk substrate
- X EPI substrate

B – crystal modification
- 4H
- 6H

C – diameter in mm
- 51 50.8mm
- 76 76.2mm

D – dopant
- N Nitrogen

e – off-orientation in °
- 0 0° off (on-axis)
- 4 4° off axis
- 8 8° off axis

F – Silicon face finish
- L lapped
- M matted (opaque)
- O optical polish (Ra≤3nm)
- P standard polish, EPI-ready (Ra≤2nm)
- C CMP, EPI-ready (Ra≤1nm)

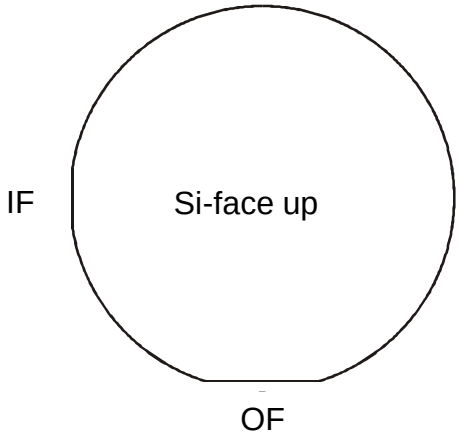
G – Carbon face finish
- L lapped
- M matted (opaque)
- O optical polish (Ra≤3nm)
- P standard polish, EPI-ready (Ra≤2nm)
- C CMP, EPI-ready (Ra≤1nm)

h – substrate thickness in µm
- 250 250µm
- 350 350µm
- 380 380µm

I – grade
- G3 production grade
- M production grade
- L production grade
- S production grade

J – options (e.g. EPI-class) according to specification

Wafer Orientation



6H N-TYPE SiC, 3” WAFER SPECIFICATION

Article Number	W6H76N-0-PM-250-S	W6H76N-0-PM-350-S
Description	Production Grade 6H SiC Substrate	
Polytype	6H	
Diameter	(76.2 ± 0.25) mm	
Thickness	(250 ± 25) µm	(350 ± 25) µm
Carrier Type	n-type	
Dopant	Nitrogen	
Resistivity (RT)	0.06 - 0.10 Ωcm	
Wafer Orientation	(0 + 0.25)°	
Micropipe Density	≤ 100 cm^{-2}	
Edge exclusion	1 mm	
Orientation flat orientation	parallel {1 –1 0 0} ± 5°	
Orientation flat length	(22.0 ± 2.0) mm	
Identification flat orientation	Si-face: 90° cw. from orientation flat ± 5°	
Identification flat length	(11.0 ± 1.5) mm	
Surface	Si –face polished	
Package	single wafer package (multi wafer shipping box upon request)	

For detailed quotes and specific requirements like off-orientation and surface finish please contact your SiCrystal sales partner.

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6H N-TYPE SiC, 2” WAFER SPECIFICATION

Article Number	W6H51N-0-PM-250-S
Description	Production Grade 6H SiC Substrate
Polytype	6H
Diameter	(50.8 ± 0.38) mm
Thickness	(250 ± 25) µm
Carrier Type	n-type
Dopant	Nitrogen
Resistivity (RT)	0.06 - 0.10 Ωcm
Wafer Orientation	(0 + 0.5)°
Micropipe Density	≤ 100 cm^{-2}
Edge exclusion	1 mm
Orientation flat orientation	parallel {1 –1 0 0} ± 5°
Orientation flat length	(15.88 ± 1.65) mm
Identification flat orientation	Si-face: 90° cw. from orientation flat ± 5°
Identification flat length	(8 ± 1.65) mm
Surface	Si -face polished
Package	single wafer package (multi wafer shipping box upon request)

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4H N-TYPE SiC, 3” NEW GENERATION WAFER SPECIFICATION

Article Number	W4H76N-4-PM-250-G3	W4H76N-4-PM-350-G3
Description	Production Grade 4H SiC Substrate	
Polytype	4H	
Diameter	(76.2 ± 0.25) mm	
Thickness	(250 ± 25) µm	(350 ± 25) µm
Carrier Type	n-type	
Dopant	Nitrogen	
Resistivity (RT)	≤ 0.025 Ωcm	
Wafer Orientation	(4 ± 0.5)°	
Micropipe-free area	≥ 95 %	
Edge exclusion	1 mm	
Orientation flat orientation	parallel {1 –1 0 0} ± 5°	
Orientation flat length	(22.0 ± 2.0) mm	
Identification flat orientation	Si-face: 90° cw. from orientation flat ± 5°	
Identification flat length	(11.0 ± 1.5) mm	
Surface	Si-face polished	
Package	single wafer package (multi wafer shipping box upon request)	

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4H N-TYPE SIC, 3" WAFER SPECIFICATION

Article Number	W4H76N-4-PM-250-M	W4H76N-4-PM-350-M
Description	Production Grade 4H SiC Substrate	
Polytype	4H	
Diameter	(76.2 ± 0.25) mm	
Thickness	(250 ± 25) µm	(350 ± 25) µm
Carrier Type	n-type	
Dopant	Nitrogen	
Resistivity (RT)	≤ 0.025 Ωcm	
Wafer Orientation	(4 ± 0.5)°	
Micropipe Density	≤ 10 / cm²	
Edge exclusion	1 mm	
Orientation flat orientation	parallel {1 –1 0 0} ± 5°	
Orientation flat length	(22.0 ± 2.0) mm	
Identification flat orientation	Si-face: 90° cw. from orientation flat ± 5°	
Identification flat length	(11.0 ± 1.5) mm	
Surface	Si-face polished	
Package	single wafer package (multi wafer shipping box upon request)	

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4H N-TYPE SiC, 3” WAFER SPECIFICATION

Article Number	W4H76N-4-PM-250-L	W4H76N-4-PM-350-L
Description	Production Grade 4H SiC Substrate	
Polytype	4H	
Diameter	(76.2 ± 0.25) mm	
Thickness	(250 ± 25) µm	(350 ± 25) µm
Carrier Type	n-type	
Dopant	Nitrogen	
Resistivity (RT)	≤ 0.025 Ωcm	
Wafer Orientation	(4 ± 0.5)°	
Micropipe Density	≤ 30 / cm²	
Edge exclusion	1 mm	
Orientation flat orientation	parallel {1 –1 0 0} ± 5°	
Orientation flat length	(22.0 ± 2.0) mm	
Identification flat orientation	Si-face: 90° cw. from orientation flat ± 5°	
Identification flat length	(11.0 ± 1.5) mm	
Surface	Si-face polished	
Package	single wafer package (multi wafer shipping box upon request)	

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4H N-TYPE SIC, 2” WAFER SPECIFICATION

Article Number	W4H51N-8-PM-380-M
Description	Production Grade 4H SiC Substrate
Polytype	4H
Diameter	(50.8 ± 0.38) mm
Thickness	(380 ± 30) µm
Carrier Type	n-type
Dopant	Nitrogen
Resistivity (RT)	≤ 0.025 Ωcm
Wafer Orientation	(8 ± 1)°
Micropipe Density	≤ 10 cm^{-2}
Edge exclusion	1 mm
Orientation flat orientation	parallel {1 –1 0 0} ± 5°
Orientation flat length	(15.8 ± 1.5) mm
Identification flat orientation	Si-face: 90° cw. from orientation flat ± 5°
Identification flat length	(8 ± 1) mm
Surface	Si-face polished
Package	single wafer package (multi wafer shipping box upon request)

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