SILICON CARBIDE

PRODUCT SPECIFICATION

6H SUBSTRATES

4H SUBSTRATES

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ATTENTION

SiCrystal products are designed exclusively for the use in electronic components.
Specifications are subject to change without notice.

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	9.2 – 9.3	9.2 – 9.3
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	9.72	9.72
Thermal Conductivity	370 W/mK	490 W/mK
Bandgap	3.23 eV	3.00 eV
Break-Down Electrical Field	$3 – 5 \cdot 10^8$ V/m	$3 – 5 \cdot 10^8$ V/m
Saturation Drift Velocity	$1.9 \cdot 10^5$ m/s	$1.5 \cdot 10^5$ m/s

References: Landolt-Börnstein (Springer Verlag), G.L. Harris (INSPEC) and
M.E. Levinshtein, S.L. Rumyantsev, M.S. Shur, Properties of advanced Semiconductor Materials, Wiley 2001

GENERAL DEFINITIONS

Article Number

ABCD-e-FG-h-I

A – type of substrate
- W bulk substrate

B – crystal modification
- 4H
- 6H

C – diameter in mm
- 51 50.8mm
- 76 76.2mm
- 100 100.0mm

D – dopant
- N Nitrogen

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

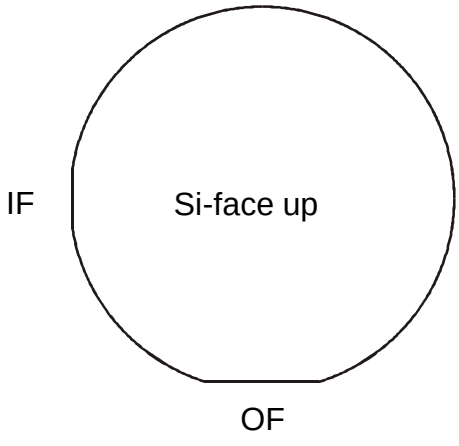
F – Silicon face finish
- P standard polish, EPI-ready (Ra≤2nm)
- C CMP, EPI-ready (Ra≤1nm)

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

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

I – grade
- Quality Grades (see specifications)

Wafer Orientation



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}
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 standard polish Epi-ready C-face matted
Package	single wafer package or multiple wafer shipping box

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4H N-TYPE SIC, 100MM WAFER SPECIFICATION

Article Number	W4H100N-4-PO (or CO) -350		
Description	4H SiC Substrate		
Polytype	4H		
Diameter	(100 + 0.0 – 0.5) mm		
Thickness	(350 ± 25) µm (Engineering grade ± 50µm)		
Carrier Type	n-type		
Dopant	Nitrogen		
Resistivity (RT)	0.012 - 0.025 Ωcm (Engineering grade <0.025 Ωcm)		
Wafer Orientation	(4 ± 0.5)°		
	Engineering Grade 2.1	**Production Grade 2.2**	**Production Grade 2.3**
Micropipe Density	≤ 30 cm^{-2}	≤ 10 cm^{-2}	≤ 1 cm^{-2}
Micropipe free area	Not specified	≥ 96%	≥ 98%
Orientation flat (OF) orientation	parallel {1 –1 0 0} ± 5°		
Orientation flat length	(32.5 ± 2.0) mm		
Identification flat (IF) orientation	Si-face: 90° cw. from orientation flat ± 5°		
Identification flat length	(18.0 ± 2.0) mm		
Surface	**Option 1 :** Si-face standard polish Epi-ready, C-face optical polish **Option 2 :** Si-face CMP Epi-ready, C-face optical polish		
Package	multiple wafer (25) shipping box (single wafer package upon request)		

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4H N-TYPE SIC, 3", 250µM WAFER SPECIFICATION

Article Number	W4H76N-4-PM (or PP or CM) -250		
Description	Production Grade 4H SiC Substrate		
Polytype	4H		
Diameter	(76.2 ± 0.25) mm		
Thickness	(250 ± 25) µm		
Carrier Type	n-type		
Dopant	Nitrogen		
Resistivity (RT)	0.012 - 0.025 Ωcm		
Wafer Orientation	(4 ± 0.5)°		
	Production Grade 3.1	**Production Grade 3.2**	**Production Grade 3.3**
Micropipe Density	≤ 30 cm^{-2}	≤ 10 cm^{-2}	≤ 1 cm^{-2}
Micropipe free area	≥ 94%	≥ 96%	≥ 98%
Orientation flat (OF) orientation	parallel {1 –1 0 0} ± 5°		
Orientation flat length	(22.0 ± 2.0) mm		
Identification flat (IF) orientation	Si-face: 90° cw. from orientation flat ± 5°		
Identification flat length	(11.0 ± 1.5) mm		
Surface	**Option 1 :** Si-face standard polish Epi-ready, C-face matted **Option 2 :** Si-face and C-face standard polish Epi-ready **Option 3:** Si-face CMP Epi-ready, C-face matted		
Package	multiple wafer (25) shipping box (single wafer package upon request)		

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4H N-TYPE SIC, 3”, 350µM WAFER SPECIFICATION

Article Number	W4H76N-4-PM (or PO or PP or CP) -350		
Description	Production Grade 4H SiC Substrate		
Polytype	4H		
Diameter	(76.2 ± 0.25) mm		
Thickness	(350 ± 25) µm		
Carrier Type	n-type		
Dopant	Nitrogen		
Resistivity (RT)	0.012 - 0.025 Ωcm		
Wafer Orientation	(4 ± 0.5)°		
	Production Grade 3.1	**Production Grade 3.2**	**Production Grade 3.3**
Micropipe Density	≤ 30 cm^{-2}	≤ 10 cm^{-2}	≤ 1 cm^{-2}
Micropipe free area	≥ 94%	≥ 96%	≥ 98%
Orientation flat (OF) orientation	parallel {1 –1 0 0} ± 5°		
Orientation flat length	(22.0 ± 2.0) mm		
Identification flat (IF) orientation	Si-face: 90° cw. from orientation flat ± 5°		
Identification flat length	(11.0 ± 1.5) mm		
Surface	**Option 1 :** Si-face standard polish Epi-ready, C-face matted **Option 2 :** Si-face standard polish Epi-ready, C-face optical polish **Option 3 :** Si-face and C-face standard polish Epi-ready **Option 4 :** Si-face CMP Epi-ready, C-face standard polish Epi-ready		
Package	multiple wafer (25) shipping box (single wafer package upon request)		

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