

**天科合达 2 英寸 SiC 晶片产品标准**  
**2 inch diameter Silicon Carbide (SiC) Substrate Specification**

等级 Grade		工业级 Production	研究级 Research Grade	试片级 Dummy Grade
直径	Diameter	50.8 mm±0.38 mm		
厚度	Thickness	330 μm±25μm		
晶片方向	Wafer Orientation	On axis : <0001>±0.5° for 6H-N/4H-N/4H-SI/6H-SI      Off axis : 4.0° toward <1120>±0.5° for 4H-N/4H-SI		
微管密度	Micropipe Density	≤5 cm <sup>-2</sup>	≤15 cm <sup>-2</sup>	≤50 cm <sup>-2</sup>
电阻率	Resistivity	4H-N	0.015~0.028 Ω·cm	
		6H-N	0.02~0.1 Ω·cm	
		4/6H-SI	>1E5 Ω·cm	(90%) >1E5 Ω·cm
主定位边方向	Primary Flat	{10-10}±5.0°		
主定位边长度	Primary Flat Length	15.9 mm±1.7 mm		
次定位边长度	Secondary Flat Length	8.0 mm±1.7 mm		
次定位边方向	Secondary Flat Orientation	Silicon face up: 90° CW. from Prime flat ±5.0°		
边缘	Edge exclusion	1 mm		
总厚度变化/弯曲度/翘曲度 TTV/Bow /Warp		≤15μm / ≤25μm / ≤25μm		
表面粗糙度	Roughness	Polish	Ra≤1 nm	
		CMP	Ra≤0.5 nm	
裂纹(强光灯观测) # Cracks by high intensity light		None	None	1 allowed, ≤1 mm
六方空洞 (强光灯观测) * Hex Plates by high intensity light		Cumulative area≤1 %	Cumulative area≤1 %	Cumulative area≤3 %
多型(强光灯观测)* Polytype Areas by high intensity light		None	Cumulative area≤2 %	Cumulative area≤5%
划痕(强光灯观测)*& Scratches by high intensity light		3 scratches to 1× wafer diameter cumulative length	5 scratches to 1× wafer diameter cumulative length	8 scratches to 1× wafer diameter cumulative length
崩边#	Edge chip	None	3 allowed, ≤0.5 mm each	5 allowed, ≤1 mm each
表面污染物 (强光灯观测) Contamination by high intensity light		None		

Notes:

\* Defects limits apply to entire wafer surface except for the edge exclusion area.

# Defects shall be existed in the edge area, only defect beyond of the prescribed scope could be considered as reject cause.

& the scratches should be checked on Si face only.

**天科合达 3 英寸 SiC 晶片产品标准**  
**3 inch diameter Silicon Carbide (SiC) Substrate Specification**

等级 Grade		工业级 Production	研究级 Research Grade	试片级 Dummy Grade
直径	Diameter	76.2 mm±0.38 mm		
厚度	Thickness	350 μm±25μm		
晶片方向	Wafer Orientation	On axis : <0001>±0.5° for 4H-N/6H-N/4H-SI/6H-SI		Off axis : 4.0° toward <1120> ±0.5° for 4H-N/4H-SI
微管密度	Micropipe Density	≤5 cm <sup>-2</sup>	≤15 cm <sup>-2</sup>	≤50 cm <sup>-2</sup>
电阻率	Resistivity	4H-N	0.015~0.028 Ω·cm	
		6H-N	0.02~0.1 Ω·cm	
		4/6H-SI	>1E5 Ω·cm	(90%) >1E5 Ω·cm
主定位边方向	Primary Flat	{10-10}±5.0°		
主定位边长度	Primary Flat Length	22.2 mm±3.2 mm		
次定位边长度	Secondary Flat Length	11.2 mm±1.5 mm		
次定位边方向	Secondary Flat Orientation	Silicon face up : 90° CW. from Prime flat ±5.0°		
边缘	Edge exclusion	2 mm		
总厚度变化/弯曲度/翘曲度 TTV/Bow /Warp		≤15μm / ≤25μm / ≤35μm		
表面粗糙度	Roughness	Polish	Ra≤1 nm	
		CMP	Ra≤0.5 nm	
裂纹(强光灯观测) # Cracks by high intensity light		None	1 allowed, ≤1 mm	1 allowed, ≤2 mm
六方空洞 (强光灯观测) * Hex Plates by high intensity light		Cumulative area ≤1%	Cumulative area ≤1%	Cumulative area ≤3%
多型(强光灯观测)* Polytype Areas by high intensity light		None	Cumulative area ≤2 %	Cumulative area ≤5%
划痕(强光灯观测)*& Scratches by high intensity light		3 scratches to 1× wafer diameter cumulative length	5 scratches to 1× wafer diameter cumulative length	8 scratches to 2× wafer diameter cumulative length
崩边#	Edge chip	None	3 allowed, ≤0.5 mm each	5 allowed, ≤1 mm each
表面污染物 (强光灯观测) Contamination by high intensity light		None		

Notes:

\* Defects limits apply to entire wafer surface except for the edge exclusion area.

# Defects shall be existed in the edge area, only defect beyond of the prescribed scope could be considered as reject cause.

& the scratches should be checked on Si face only.

**天科合达 4 英寸 SiC 晶片产品标准**  
**4 inch diameter Silicon Carbide (SiC) Substrate Specification**

等级 Grade		Z 级 Zero MPD	工业级 Production	研究级 Research Grade	试片级 Dummy Grade
直径	Diameter	100.0 mm±0.5 mm			
厚度	Thickness	350 μm±25μm			
晶片方向	Wafer Orientation	Off axis : 4.0° toward $\langle 11\bar{2}0 \rangle \pm 0.5^\circ$ for 4H-N/4H-SI		On axis : $\langle 0001 \rangle \pm 0.5^\circ$ for 6H-N/6H-SI/4H-N/4H-SI	
微管密度	Micropipe Density	≤1 cm <sup>2</sup>	≤5 cm <sup>2</sup>	≤15 cm <sup>2</sup>	≤50 cm <sup>2</sup>
电阻率	Resistivity	4H-N	0.015~0.028 Ω·cm		
		6H-N	0.02~0.1 Ω·cm		
		4/6H-SI	≥1E5 Ω·cm		
主定位边方向	Primary Flat	{10-10}±5.0°			
主定位边长度	Primary Flat Length	32.5 mm±2.0 mm			
次定位边长度	Secondary Flat Length	18.0mm±2.0 mm			
次定位边方向	Secondary Flat Orientation	Silicon face up: 90° CW. from Prime flat ±5.0°			
边缘去除	Edge exclusion	3 mm			
总厚度变化/弯曲度/翘曲度 TTV/Bow /Warp		≤15μm / ≤25μm / ≤40μm			
表面粗糙度	Roughness	Polish	Ra≤1 nm		
		CMP	Ra≤0.5 nm		
裂纹(强光灯观测) # Cracks by high intensity light		None	1 allowed, ≤2 mm		Cumulative length ≤ 10mm, single length≤2mm
六方空洞 (强光灯观测) * Hex Plates by high intensity light		Cumulative area ≤1%	Cumulative area ≤1%		Cumulative area ≤3%
多型(强光灯观测)* Polytype Areas by high intensity light		None	Cumulative area ≤2%		Cumulative area ≤5%
划痕(强光灯观测)*& Scratches by high intensity light		3 scratches to 1× wafer diameter cumulative length	5 scratches to 1× wafer diameter cumulative length		5 scratches to 1× wafer diameter cumulative length
崩边#	Edge chip	None	3 allowed, ≤0.5 mm each		5 allowed, ≤1 mm each
表面污染物 (强光灯观测) Contamination by high intensity light		None			

Notes:

\* Defects limits apply to entire wafer surface except for the edge exclusion area.

# Defects shall be existed in the edge area, only defect beyond of the prescribed scope could be considered as reject cause.

& the scratches should be checked on Si face only.

**天科合达 6 英寸 SiC 晶片产品标准**  
**6 inch diameter, Silicon Carbide (SiC) Substrate Specification**

等级 Grade		Z 级 Zero MPD	工业级 Production Grade	研究级 Research Grade	试片级 Dummy Grade
直径	Diameter	150.0 mm±0.2mm			
厚度	Thickness <sup>△</sup>	350 μm±25μm			
晶片方向	Wafer Orientation	Off axis : 4.0° toward $\langle 11\bar{2}0 \rangle \pm 0.5^\circ$ for 4H-N		On axis : $\langle 0001 \rangle \pm 0.5^\circ$ for 6H-SI/4H-SI	
主定位边方向	Primary Flat	{10-10}±5.0°			
主定位边长度	Primary Flat Length	47.5 mm±2.5 mm			
边缘	Edge exclusion	3 mm			
总厚度变化/弯曲度/翘曲度 TTV/Bow /Warp		≤15μm / ≤40μm / ≤60μm			
微管密度	Micropipe Density	≤1 cm <sup>-2</sup>	≤5 cm <sup>-2</sup>	≤15 cm <sup>-2</sup>	≤50 cm <sup>-2</sup>
电阻率	Resistivity	4H-N	0.015~0.028 Ω·cm		
		4/6H-SI	≥1E5 Ω·cm		
表面粗糙度	Roughness	Polish	Ra≤1 nm		
		CMP	Ra≤0.5 nm		
裂纹(强光灯观测) # Cracks by high intensity light		None	1 allowed, ≤2 mm		Cumulative length ≤ 10mm, single length≤2mm
六方空洞 (强光灯观测) * Hex Plates by high intensity light		Cumulative area ≤1%	Cumulative area ≤2%		Cumulative area ≤5%
多型(强光灯观测)* Polytype Areas by high intensity light		None	Cumulative area≤2%		Cumulative area≤5%
划痕(强光灯观测)*& Scratches by high intensity light		3 scratches to 1× wafer diameter cumulative length	5 scratches to 1× wafer diameter cumulative length		5 scratches to 1× wafer diameter cumulative length
崩边#	Edge chip	None	3 allowed, ≤0.5 mm each		5 allowed, ≤1 mm each
表面污染物 (强光灯观测) Contamination by high intensity light		None			

Notes:

△ Thickness of 500μm±25μm is available upon request.

\* Defects limits apply to entire wafer surface except for the edge exclusion area.

# Defects shall be existed in the edge area, only defect beyond of the prescribed scope could be considered as reject cause.

& the scratches should be checked on Si face only.