

E L E C T R O N I C S

Advanced Ceramics for Power
Electronics Applications

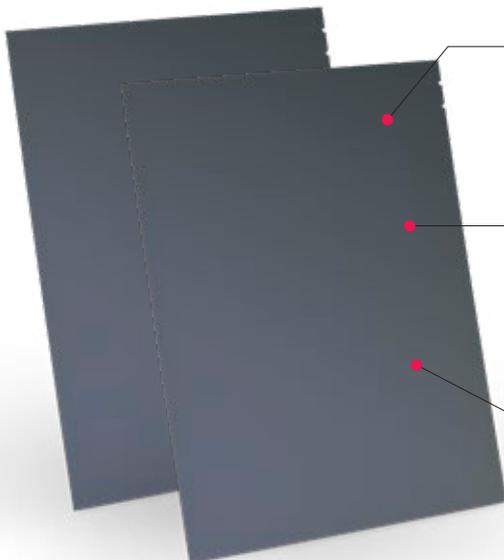
**Material properties
of Sinalit®**

Silicon Nitrite – Sinalit®

CeramTec's newly developed Silicon Nitrite is the high performance ceramic material with highest bending strength (≥ 700 MPa) and highest fracture toughness ($\geq 5-7$ MPa $\cdot\sqrt{m}$) compared to Al_2O_3 , ZTA and AlN which leads to extreme robustness for highest power density power electronics with thin Sinalit® substrate (≥ 0.25 mm). Thermal conductivity is also high (80 W/mK). Combined with AMB (Active Metal Brazing) or SMB (Sputter Metal Bonding) metalization Sinalit® is the ideal choice for WBG (Wide Band Gap) Dice, e.g., semiconductors based power modules.



Key advantages



Highest bending strength ≥ 700 MPa
with highest fracture toughness > 6

Breakdown strength AC: ≥ 25 kV/mm

Highest robustness for highest power
density power electronics



Standard Specification for Sinalit®

Physical Parameters		Unit	Values	Measurement Method
Surface roughness	Ra	µm	< 0.5	Based on DIN EN ISO 4288
Bulk density	-	g/cm ³	≥ 3.2	Based on DIN EN 993-1
Bending Strength	Sigma0	MPa	≥ 700	Based on ASTM C 1499-08
Young's Modulus	-	GPa	280	Based on ASTM C 1259-15
Thermal conductivity	RT	W/(m x K)	80	According to DIN EN 821-2; measured thermal conductivity value may vary +/- 10% due to measurement inaccuracy.
Coefficient of thermal expansion	100 - 200 °C	ppm/K	2.3	According to DIN 51045-1, typical value
	100 - 300 °C	ppm/K	2.5	
	100 - 600 °C	ppm/K	3.1	
	100 - 800 °C	ppm/K	3.3	
Specific heat	20 °C	J/(kg x K)	≥ 0.6	Based on DIN EN 821-3, method B, typical value
	100 °C	J/(kg x K)	≥ 0.7	
Dielectric constant (permittivity)	RT, 1 MHz	-	8.3	Based on ASTM D150, typical value
Dielectric loss factor	RT, 1 MHz	[10 ⁻³]	3	Based on ASTM D150
Volume resistivity	RT	Ωcm	≥ 10 ¹⁴	Based on IEC 62631-3, typical value
Breakdown Strength 20 °C	-	kV/mm	≥ 25	Based on DIN EN 60243-1

The measured values referenced above were determined for test samples and are applicable as standard values. The values were determined on the basis of DIN-INDIN-VDE standards and if these were not available, on the basis of CeramTec standards. The values indicated must not be transferred to arbitrary and/or other formats, components or parts featuring different surface qualities. They do not constitute a guarantee for certain properties. We expressly reserve the right to make technical changes.

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