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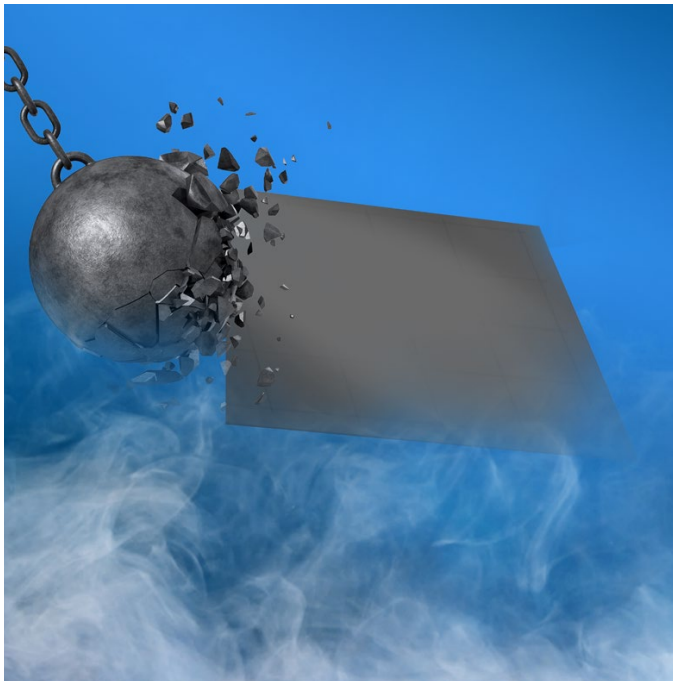
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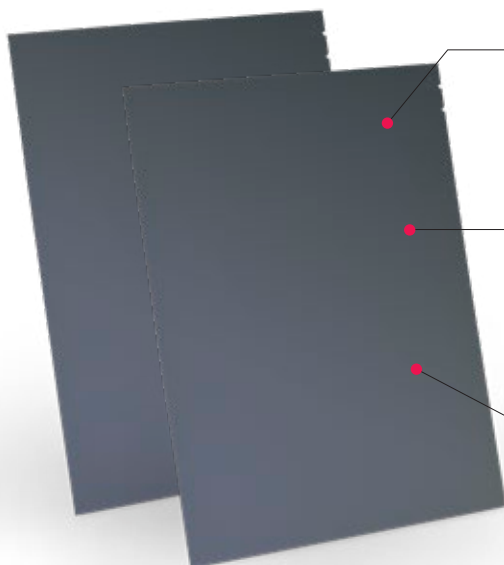
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Silicon Nitrite – Sinalit®

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-IDIN-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.

Aluminium Nitride – Alunit® AlN HP

CeramTec's newly developed Aluminium Nitride is a much better material that has improved the quality of our Aluminium Nitride with much higher bending strength (≥ 450 MPa) at the same thermal conductivity (170 W/mK) for best heat transmission / heat spread of your power electronics DCB (Direct Copper Bonded) or AMB (Active Metal Brazing) ceramic board.



Key advantages

Higher Bending Strength
 ≥ 450 MPa

Breakdown strength
AC: ≥ 15 kV/mm

High robustness means equal
bending strength as CT Al_2O_3





Standard Specification for Alunit® AIN HP

Physical Parameters		Unit	Values	Measurement Method
Surface roughness	-	µm	≤ 0.4	Based on DIN EN ISO 4288
Bulk density	-	g/cm ³	≥ 3.34	Based on DIN EN 993-1
Bending Strength	Sigma0	MPa	≥ 450	Based on ASTM C1499-08
Young's Modulus	-	GPa	300	Based on ASTM C1250-15, typical value
Thermal conductivity	RT	W/(m x K)	170	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	3.7-5.7	According to DIN 51045-1, typical value
	100 - 300 °C	ppm/K	3.7-5.7	
	100 - 600 °C	ppm/K	4.5-5.9	
	100 - 800 °C	ppm/K	4.8-6.2	
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	-	8.5	Based on ASTM D150, typical value
Dielectric loss factor	RT, 1 MHz	[10 ⁻³]	≤ 10	Based on ASTM D150
Volume resistivity	RT	Ωcm	10 ¹⁴	Based on IEC 62631-3, typical value
Breakdown Strength 20 °C	-	kV/mm	≥ 15	Based on DIN EN 60243-1

The measured values mentioned before were determined for test samples and are applicable as standard values. The values were determined on the basis of DIN-VDI-VDE standards and if these were not available, on the basis of CeramTec standards. The values indicated must not be transferred to arbitrary 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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