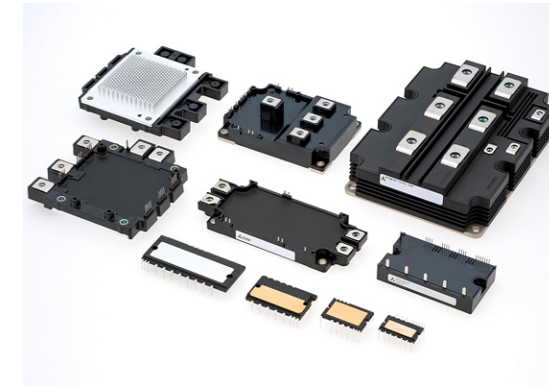


96% Alumina Ceramic Substrate

Product Description

96% alumina substrate (96% aluminum oxide substrate) is mainly produced by tape casting process. It has the characteristics of obtaining large size, good uniformity and high density. This manufacturing process is suitable for metallization of various patterns on ceramic materials and is widely used in the automotive electronics industry, thick film resistor industry, LED industry, IGBT modules, special refrigerators, etc.

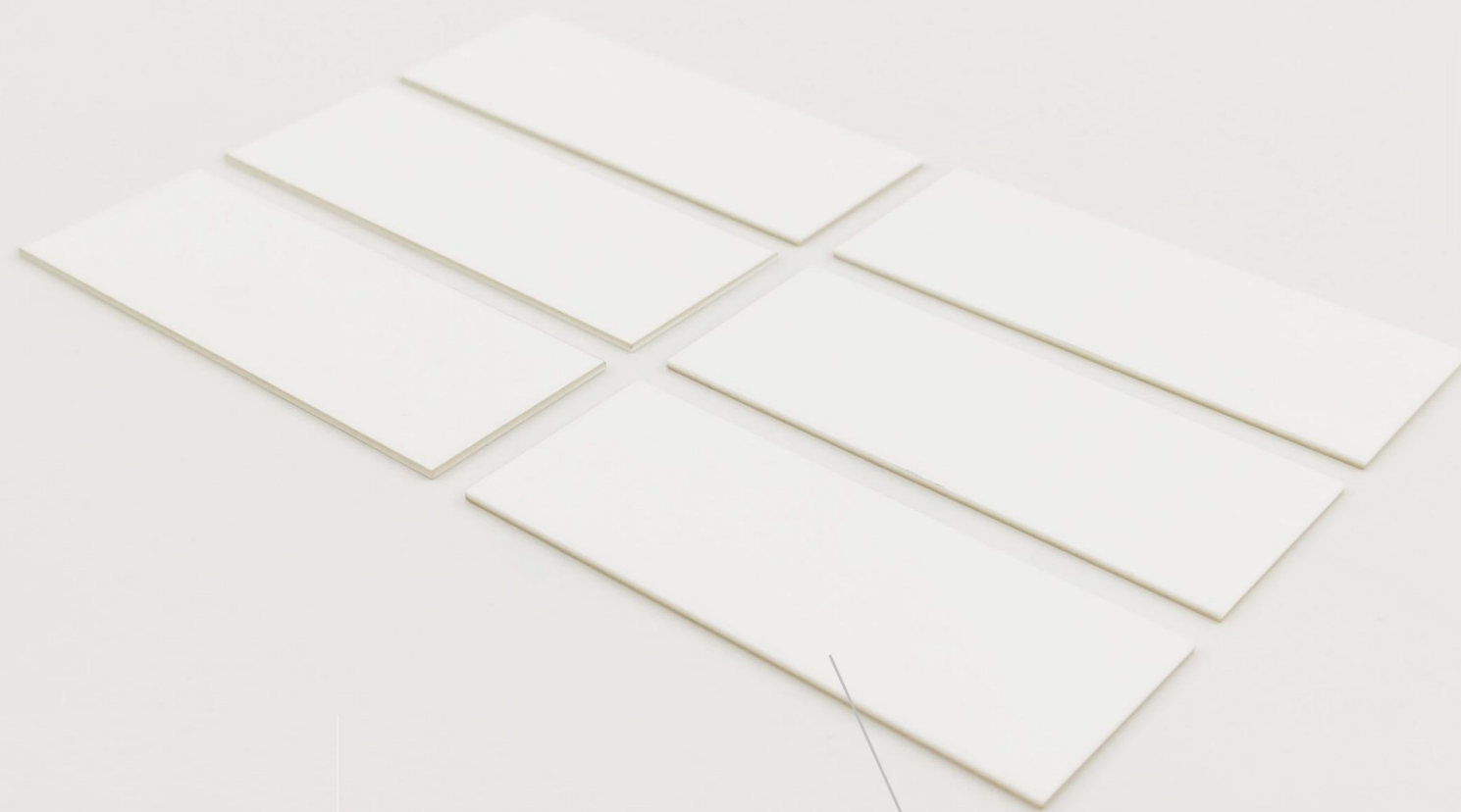


Product Performance

- (1) Relatively high thermal conductivity and can efficiently dissipate heat;
- (2) Excellent electrical insulators, ideal for applications in electronic circuits and semiconductor devices;
- (3) High mechanical strength and hardness and can withstand mechanical stress, making them suitable for applications in harsh environments;
- (4) They can be manufactured with a very smooth surface finish. The smooth surface and thermal stability make them well-suited for metallization;
- (5) They offer a good balance between performance and cost and are one of the most cost-effective substrate material;

Main Application

Integrated circuits (ICs)
 LED packages
 Transistors and diodes
 Capacitors
 Resistors
 Heat sinks
 Substrates for power modules
 Thermal insulators
 Substrate for DBC and DPC technologies
 Oxygen sensors
 Heating elements
 Furnace and Kiln setter
 Microwave components
 Insulators for high-voltage applications



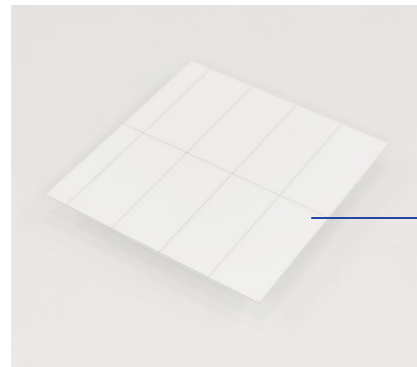
Density $\geq 3.7 \text{g/cm}^3$

Thermal Conductivity $> 24 \text{W/(m}\cdot\text{k)}$

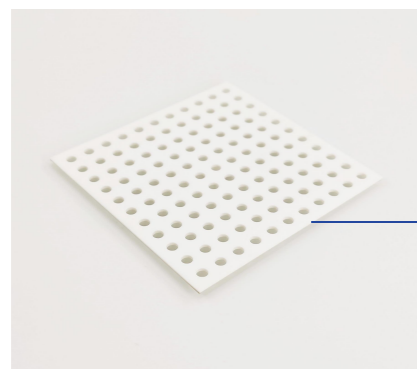
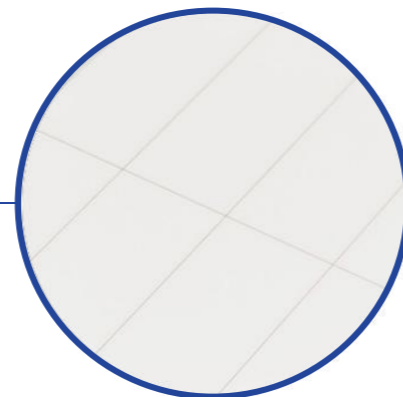
Flexural Strength $> 350 \text{Mpa}$

96% Alumina Substrate

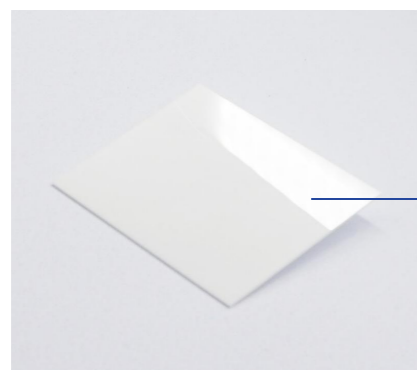
Alumina Substrate Machining



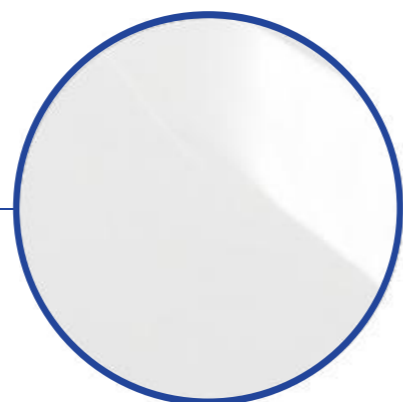
scribing substrate



drilling substrate



polishing substrate



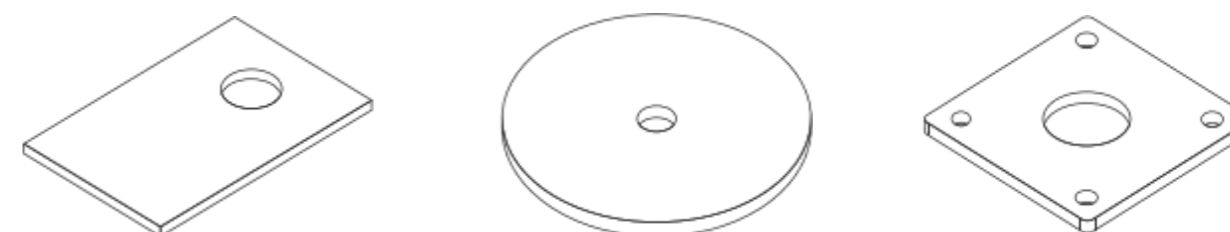
Materials Properties

Item	Unit	Value A96
Colour	—	White
Density	g/cm ³	≥3.70
Surface Roughness Ra	μm	0.300-0.600
Flexural Strength	Mpa	>350
Camber	Length%	≤3
Thermal Conductivity	25°C,W/(m·k)	24
Coefficient of Thermal Conductivity	10- 6/K(20-800°C)	6.0~8.0
Dielectric Constant	KV/mm	>9-10
Volume Resistance	25°C,Ω·cm	>10 ⁴

Specification

Product	Thickness	Length*Width
96%Alumina Substrate	0.25mm	
	0.38mm	
	0.5mm	110*110 ; 101.6*101.6 ; 114.3*114.3
	0.635mm	120*120 ; 127*127 ; 130*109 ; 130*140
	0.76mm	140*190
	0.89mm	
	1.0mm	
	1.2-2.0mm	110*110 ; 120*120

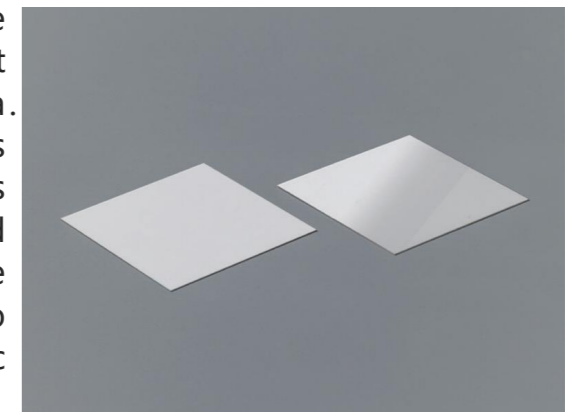
Custom Shape Example



99.6% Alumina Substrate Aluminum Oxide Substrate

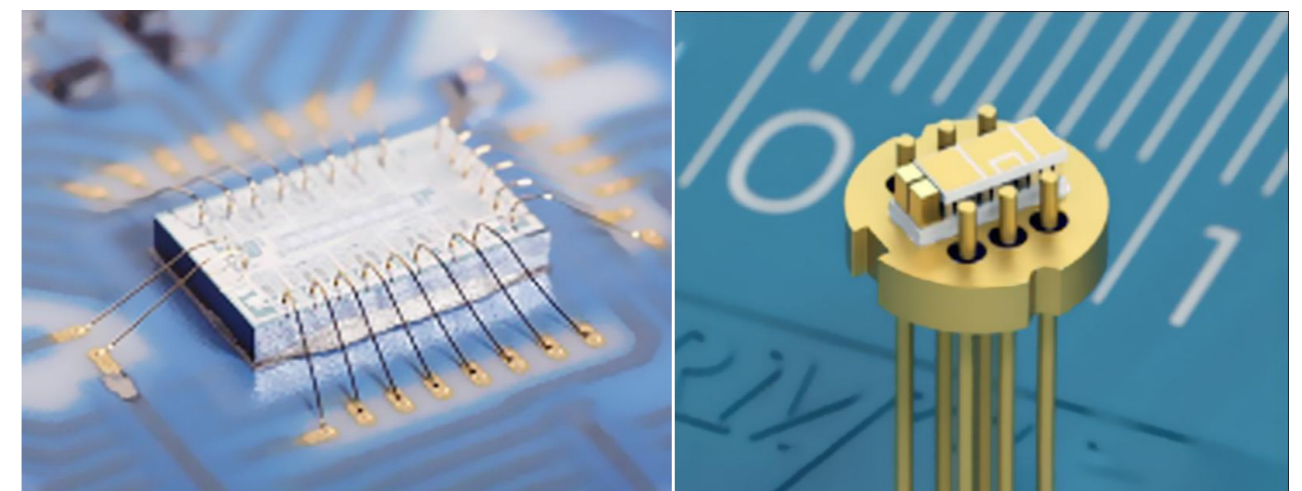
Product Description

99.6% alumina ceramic substrates are manufactured from raw materials that are at least 4N grade high-purity alumina. Each production process necessitates tight quality control and meets various performance requirements for integrated circuits. They are widely produced for the thin film circuits industry, used in radio frequency components, optoelectronic components, and electronic packaging.



Product Advantages

- (1) High purity, extremely smooth surface, high finish, no holes;
- (2) The grains have a solid structure and are exceedingly fine and uniform;
- (3) The dielectric constant is stable and uniform;
- (4) Low dielectric loss, and effective insulation.



Density $\geq 3.88 \text{ g/cm}^3$
Thermal Conductivity $\geq 30 \text{ W/(m}\cdot\text{K)}$
Bending Strength $\geq 550 \text{ MPa}$

Materials Properties

Item	Unit	Value
Colour	—	White
Bending Strength	MPa	≥550
Thermal Conductivity	25°C,W/(m·k)	≥30
Bulk Density	g/cm ³	≥3.88
Water Absorption	%	0
Coefficient of Thermal Expansion	ppm/°C	≤7.2
Volume resistivity	Ω*cm	≥10 ¹⁴
Dielectric constant (1MHz)	/	9.9
Dielectric loss (1MHz)	10 ⁻⁴	1.0
Insulation Strength	KV/mm	≥15

Specification

Product	Thickness	Length*Width
99.6% Alumina Substrate	0.127mm	50.8*50.8mm ; 76.2*76.2mm
	0.254mm	
	0.381mm	101.6*101.6mm; 101.6mm
	0.508mm	
	0.635mm	
	1.0-3.0mm	

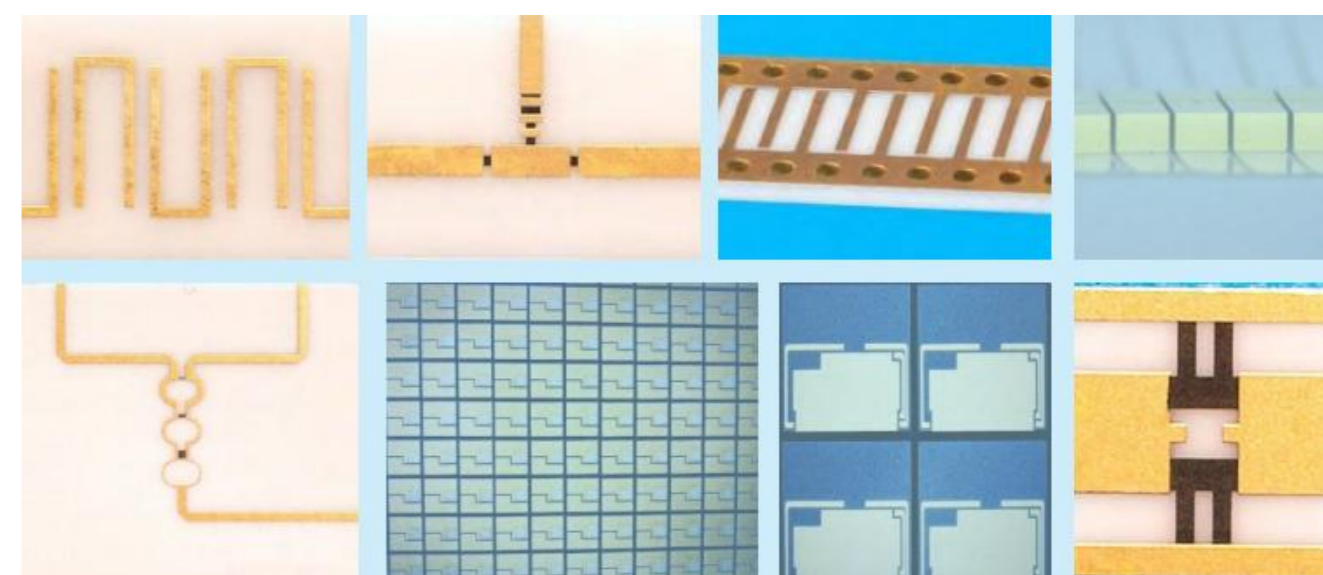
Note: special specifications can be laser cut or customized according to customer requirements.

Appearance Information

Item	As-fired	Lapped and grinded	Polished
Surface Roughness Ra	Front: 50-80nm	100-300nm	≤25nm
	Back: 100-200nm	can be customized	
Camber	≤0.3%	≤0.3%	≤0.3%
Thickness Tolerance	± 10%	± 0.1mm	± 0.1mm
Length Width Tolerance	± 0.3mm	± 0.3mm	± 0.3mm

Main Application

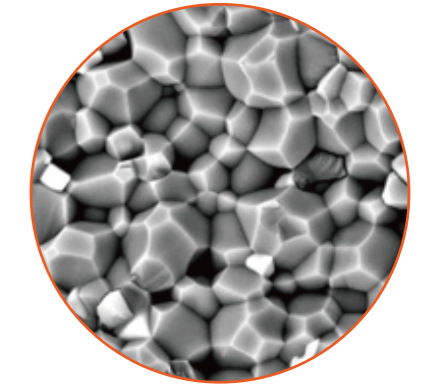
99.6% alumina ceramic substrate is extensively used as a substrate material in the radio frequency microwave electronics industry. Its high dielectric constant allows for circuit miniaturization. It has excellent thermal stability and low temperature drift. Additionally, it possesses high strength and exceptional chemical stability, and its performance is superior to that of most other oxide materials, making it suitable for various thick film circuits, thin film circuits, hybrid circuits, microwave component modules, etc.



High thermal conductivity Aluminum Nitride Ceramic Substrate

Product Description

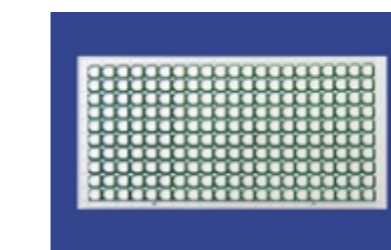
Aluminum nitride ceramic substrate has excellent thermal conductivity, low dielectric constant and dielectric Loss, reliable insulation performance; excellent mechanical properties, non-toxic, high temperature resistance, chemical corrosion resistance. With the rapid development of microelectronic equipment, high thermal conductivity aluminum nitride substrates are widely used in communication devices, high-brightness LEDs, power electronic devices industry. It is an electronic ceramic material with excellent performance.



Product Performance

- (1) Thermal conductivity is high, 5-10 times that of alumina ceramics, equivalent to beryllium oxide (BeO), and the thermal conductivity can reach more than 200w;
- (2) Thermal expansion coefficient ($4.3 \times 10^{-6}/K$) matches semiconductor silicon material;
- (3) Good mechanical property, flexural strength higher than BeO ceramics, close to alumina;
- (4) Excellent electrical properties, extremely high insulation resistance and low dielectric loss;
- (5) The circuit materials have good compatibility and can carry out multi-layer wiring to achieve high density and miniaturization of packaging;
- (6) Non-toxic and environmentally friendly.

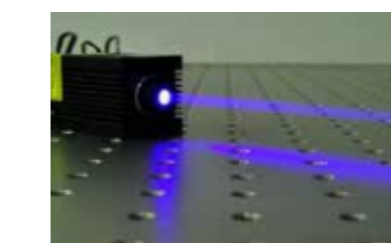
Main Application



LED Packages

LED Packages

Aluminum nitride substrate has excellent properties such as high thermal conductivity, high flexural strength, and thermal expansion coefficient matching that of Si. It will gradually replace traditional high-power LED substrate materials and become the most promising ceramic substrate material in the future.



GaAs Laser

High Power Laser Semiconductor LD

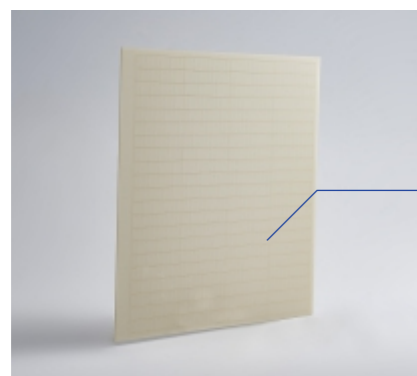
Ceramic circuit boards have good thermal and electrical properties. At present, GaAs lasers basically use ceramic circuit boards, and among ceramic circuit boards, aluminum nitride ceramic circuit boards are the most commonly used. High thermal conductivity aluminum nitride chips can ensure that the part of high-power laser light energy converted into heat energy is exported in time, preventing laser The chip temperature rises to ensure stable operation.



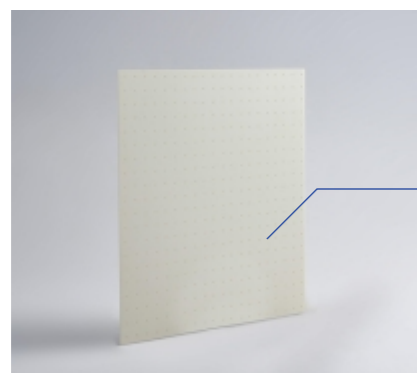
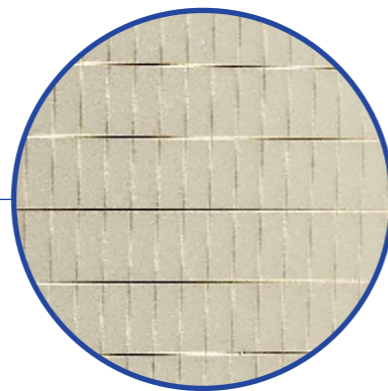
Density $\geq 3.30 \text{ g/cm}^3$
 Thermal Conductivity $> 200 \text{ W/(m}\cdot\text{k)}$
 Flexural Strength $> 320 \text{ MPa}$

Aluminum Nitride Substrate

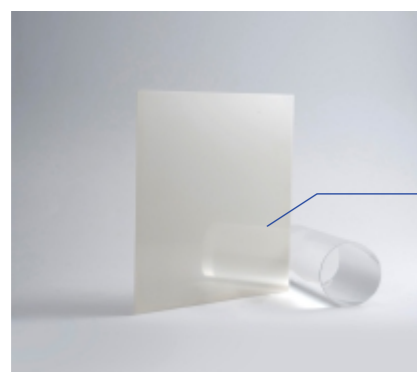
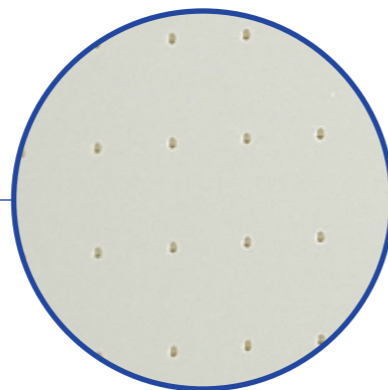
AlN substrate Machining



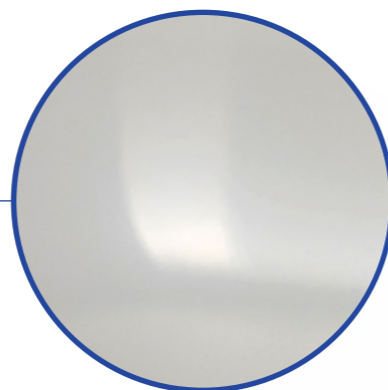
scribing substrate



drilling substrate



polishing substrate



Materials Properties

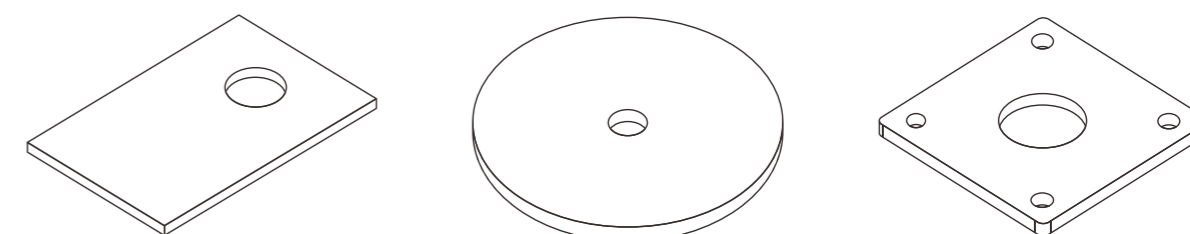
Item	Unit	Value	Value
		ALN-170	ALN-200
Colour	—	Grey	Grey
Density	g/cm ³	≥3.30	≥3.26
Surface Roughness Ra	μm	0.300-0.600	0.300-0.600
Flexural Strength	MPa	>400	>320
Camber	Length ‰	≤2	≤2
Thermal Conductivity	25°C,w/(m·k)	>170	>200
Coefficient of Thermal Expansion	10 ⁻⁶ /K(40-400%大)	4.0~5.0	4.0~5.0
	10 ⁻⁶ /K(40-800%大)	3.5	3.5
Dielectric Constant	KV/mm	>17	>17
Volume Resistance	25°C,Ω·cm	>10 ¹⁴	>10 ¹⁴

Specification

Product	Thickness	Length*Width
AlN Ceramic Substrate	0.2mm	50.8*50.8mm,110*110mm,114.3*114.3mm 120*120mm,127*127mm,138*190mm
	0.381mm	
	0.5mm	
	0.635mm	
	1.0mm	
	1.5mm	
	2.0mm	
	3.0mm	

Note: specified dimensions can be laser processed or customized according to customer requirements.

Substrate Shapes Example



Silicon Nitride ceramic Substrate



Density $\geq 3.17 \text{ g/cm}^3$
Thermal Conductivity $\geq 80 \text{ W/(m}\cdot\text{K)}$
Bending Strength $\geq 700 \text{ MPa}$



Product Description

Silicon nitride ceramic substrates have high hardness, high strength, small thermal expansion coefficient, small high-temperature creep, good oxidation resistance, good hot corrosion performance, and friction resistance. It shows excellent mechanical properties under high-frequency vibration or high temperature conditions. Therefore it is widely used in aerospace, high-speed rail, new energy vehicles and other fields. They are important core heat dissipation material in insulated gate bipolar transistors ("IGBT") and silicon carbide power modules (SiC MOSFET).

Product Advantages

- (1) High strength and fracture toughness at high temperatures;
- (2) Extremely high chemical corrosion resistance and good wear resistance;
- (3) Equipment using silicon nitride ceramic substrates can further reduce the size;
- (4) The heat dissipation coefficient is high, the thermal expansion coefficient matches the chip, and it has extremely high thermal shock resistance.

Materials Properties

Item	Unit	Value Si ₃ N ₄
Colour	—	Grey
Bending Strength	MPa	≥700
Young's modulus	Gpa	310
Thermal Conductivity	25°C,W/(m·k)	≥80
Bulk Density	g/cm ³	≥3.17
Breakdown Strength	KV/mm	≥20
Coefficient of Thermal Expansion	10 ⁻⁶ /K(RT-400°C)	≤2.7
Fracture Toughness	MPa·m ^{1/2}	≥6.5
Vickers hardness	Gpa	≥13
Volume resistivity	Ω*cm	≥10 ¹⁴
Dielectric constant (1MHz)	/	7.8
Dielectric loss (1MHz)	10 ⁻³	0.4
Surface Roughness Ra	μm	≤0.8
Camber	Diagonal‰	≤3.0

Specification

Product	Thickness	Legnth*Width
Silicon Nitride Ceramic Substrate	0.254mm	190.0*138.0mm (±1%) 114.3*114.3mm (±1%)
	0.320mm	
	0.635mm	
	1.000mm	

Note: special specifications can be laser cut or customized according to customer requirements.

Excellent performance



High Thermal Conductivity



Insulated



High Strength

Main Application



IGBTModule

IGBT(Insulated gate bipolar transistor)

IGBT is known as the "CPU" of modern industrial converter devices, used in rail transportation, aerospace, new energy vehicles, wind power, national defense industry and other battlefields. The heat generated by the IGBT module is mainly conducted to the shell through the Silicon Nitride Ceramic Copper-clad Substrate and dissipated. Silicon nitride ceramic copper clad substrate is an indispensable key basic material for power module packaging in the field of power electronics.



SiC MOSFET (silicon carbide power module)

SiC MOSFET

Compared with traditional silicon-based IGBT modules, SiC MOSFET (silicon carbide power module) has low conduction loss, low switching loss, used in vehicle charging systems and power conversion systems, can effectively reduce switching losses, increase the ultimate operating temperature, and improve system efficiency rate.