



Ceramic Substrates

Provide a range of high-performance substrates designed to meet different application needs

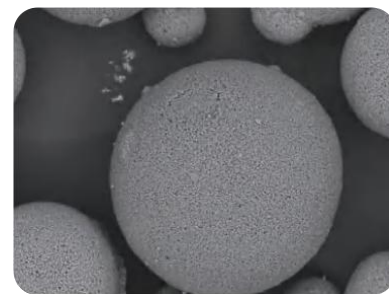
**High Heat
Resistance**

**High Mechanical
Strength**

**Excellent Electrical
Insulation**

■ Powder Materials

- Independent and controllable materials with stable quality
- Low impurity content and high powder purity
- Batch production of powders, more stable
- Performance parameters can be customized



Granulated Powder Morphology

■ Granulated Powder Morphology And Crushability

Features

1. High liquidity
2. Excellent crush resistance
3. Small batch variation



■ Powder Material Properties Table

Category	Test Items	Unit	75% Al ₂ O ₃	95% Al ₂ O ₃
Powder Characteristics	Granulation Powder Particle Size	μm	80~100	80~100
	Flow Rate	s/50g	<80	<70
	Bulk Density	g/cm ³	1.0~1.1	1.10~1.25
	Moisture Content	wt%	0.1~0.5	0.1~0.5
	Loss on Ignition Rate	wt%	5.5~6.5	5.5~6.5
	Green Body Density	g/cm ³	2.0~2.2	2.2~2.3
	Shrinkage	%	15.0~16.0	15.0~16.0
Ceramic Properties	Ceramic Color	/	White	White
	Sintered Density	g/cm ³	3.20~3.40	3.70~3.75
	Bending Strength	MPa	230~280	350~400

■ Specifications and Dimensions

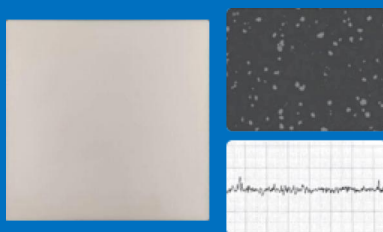
Material	Unit	Al ₂ O ₃	ZTA	AlN	Si ₃ N ₄
Effective Dimensions (A, B)	mm	50.8-190	50.8-190	50.8-190	138*190
Thickness (T)	mm	0.25-1.5	0.25-1.5	0.25-1.0	0.25 , 0.32
Thickness Tolerance	mm	±5% (Min±0.03mm)			
Warpage (C)	mm	≤0.3%			
surface Roughness	μm	0.2-0.6	0.2-0.5	0.2-0.75	0.2-0.75
Size, thickness and surface roughness can be customized					

■ Specifications and Dimensions



Laser Processing

Project	Qualified	Special Grade
Internal Dimension Tolerance	±0.05mm	±0.03mm
External Dimension Tolerance	±0.15mm	±0.1mm
Hole Tolerance (φ0.07-0.15mm)	±0.05mm	±0.02mm
Hole Tolerance (φ > 0.15mm)	±0.1mm	±0.02mm



Grinding and Polishing
Sheet Roughness Table

Project	Surface Roughness (μm)	
	Qualified	Special Grade
Grinding	0.3-0.6	0.3-0.5
Fine grinding	0.1-0.4	0.1-0.3
Polishing	≤0.1	≤0.05

Alumina (Al₂O₃)

Applications

- Thick film and thin film chip resistors
- Low power LED
- Gaskets for energy storage, charging piles, etc.



Features

1. High thermal shock resistance
2. Low warpage
3. High temperature resistance, good acid and alkali corrosion resistance
4. Excellent processing performance

Project		Test Conditions	Unit	Al ₂ O ₃			
				A1296	A1296A	A2296	A996
Material		-	-	96%	96%	96%	99.6%
Appearance		-	-	White Dense			
Surface Roughness		Ra	μm	0.2~0.6			
Density		-	g/cm ³	≥3.70	≥3.60	≥3.75	≥3.8
Physical Properties	Bending Strength	3-Point Bending Resistance	MPa	≥380	≥350	≥400	≥450
	Vickers Hardness	Load 4.9	GPa	≥14	≥13	≥14	≥14
	Water Absorption	-	%	0			
Thermal Performance	Thermal Conductivity	25°C	W/(m·k)	≥22	≥19	≥24	≥27
	Linear Thermal Expansion Coefficient	25°C~500°C	1×10 ⁻⁶ mm/°C	6.6~7.5			6.6~7.5
	Thermal Shock Resistance	800°C	Time	≥10			≥10
	Specific Heat	-	J/(kg·K)	880			780
Electrical Properties	Dielectric Constant	1MHz/25°C	-	9~10			9~10
	Dielectric Loss	1MHz/25°C	×10 ⁻⁴	≤3			≤0.5
	Volume Resistivity	25°C	Ω·cm	>10 ¹⁴			>10 ¹⁴
	Breakdown Voltage	-	KV/mm	>12			>15
Light Performance	Reflectivity	Reflectivity Meter	-	>92%	>95%	>88%	>90%
	Whiteness	Whiteness Meter	-	>88	>86	>88	-

Aluminum Nitride (AlN)

Applications

- High power IGBT power module
- High power LED
- High power heat sink



Features

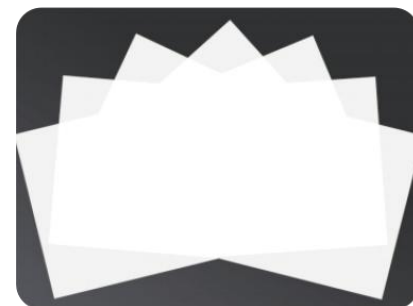
1. High thermal conductivity
2. Thermal expansion coefficient close to silicon wafer
3. High breakdown voltage

Project		Test Conditions	Unit	AlN		
				AN-170	AN-200	AN-230
Material		-	-	AlN	AlN	AlN
Appearance		-	-	Light Blue	Beige	Beige
Surface Roughness		Ra	μm	0.2~0.75		
Density		-	g/cm ³	≥3.3		
Physical Properties	Bending Strength	3-Point Bending Resistance	MPa	≥400	≥350	≥300
	Vickers Hardness	Load 4.9	GPa	≥10		
	Water Absorption	-	%	-		
Thermal Performance	Thermal Conductivity	25°C	W/(m·k)	≥170	≥200	≥230
	Linear Thermal Expansion Coefficient	25°C~500°C	1×10 ⁻⁶ mm/°C	4~6		
	Thermal Shock Resistance	800°C	Time	≥10		
	Specific Heat	-	J/(kg·K)	720		
Electrical Properties	Dielectric Constant	1MHz/25°C	-	8~9		
	Dielectric Loss	1MHz/25°C	×10 ⁻⁴	≤3		
	Volume Resistivity	25°C	Ω·cm	>10 ¹⁴		
	Breakdown Voltage	-	KV/mm	>17		
Light Performance	Reflectivity	Reflectivity Meter	-	-		
	Whiteness	Whiteness Meter	-	-		

Zirconia (ZTA)

Applications

- Medium power supply module
- Medium power LED
- Instruments



Features

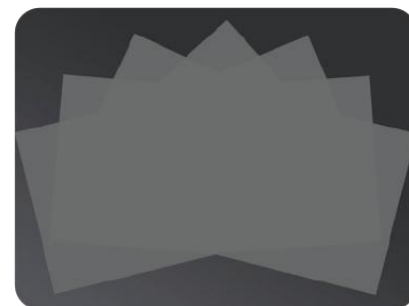
1. High strength
2. High reflectivity
3. High thermal shock resistance
4. Excellent processing performance

Project		Test Conditions	Unit	Al ₂ O ₃ /ZrO ₂
				ZTA
Material		-	-	Al ₂ O ₃ /ZrO ₂
Appearance		-	-	White Dense
Surface Roughness		Ra	μm	0.2~0.5
Density		-	g/cm ³	≥3.85
Physical Properties	Bending Strength	3-Point Bending Resistance	MPa	≥550
	Vickers Hardness	Load 4.9	GPa	≥14
	Water Absorption	-	%	0
Thermal Performance	Thermal Conductivity	25°C	W/(m·k)	≥23
	Linear Thermal Expansion Coefficient	25°C~500°C	1x10 ⁻⁶ mm/°C	6.6~7.5
	Thermal Shock Resistance	800°C	Time	≥10
	Specific Heat	-	J/(kg·K)	720
Electrical Properties	Dielectric Constant	1MHz/25°C	-	10~11
	Dielectric Loss	1MHz/25°C	x10 ⁻⁴	≤3
	Volume Resistivity	25°C	Ω·cm	>10 ¹⁴
	Breakdown Voltage	-	KV/mm	>15
Light Performance	Reflectivity	Reflectivity Meter	-	≥95%
	Whiteness	Whiteness Meter	-	-

Silicon Nitride (Si_3N_4)

Applications

- High power IGBT power module
- High power heat sink
- Wireless module



Features

1. High thermal conductivity
2. Thermal expansion coefficient close to silicon wafer
3. High strength and toughness

Project		Test Conditions	Unit	Si_3N_4
				SN-90
Material		-	-	Si_3N_4
Appearance		-	-	Grey
Surface Roughness		Ra	μm	0.2~0.75
Density		-	g/cm^3	≥ 3.2
Physical Properties	Bending Strength	3-Point Bending Resistance	MPa	≥ 750
	Vickers Hardness	Load 4.9	GPa	≥ 14
	Water Absorption	-	%	0
Thermal Performance	Thermal Conductivity	25°C	$\text{W}/(\text{m}\cdot\text{K})$	≥ 85
	Linear Thermal Expansion Coefficient	25°C~500°C	$1 \times 10^{-6} \text{ mm}/^\circ\text{C}$	2~4
	Thermal Shock Resistance	800°C	Time	≥ 10
	Specific Heat	-	$\text{J}/(\text{kg}\cdot\text{K})$	680
Electrical Properties	Dielectric Constant	1MHz/25°C	-	7~8
	Dielectric Loss	1MHz/25°C	$\times 10^{-4}$	≤ 4
	Volume Resistivity	25°C	$\Omega\cdot\text{cm}$	$> 10^{14}$
	Breakdown Voltage	-	KV/mm	> 15
Light Performance	Reflectivity	Reflectivity Meter	-	-
	Whiteness	Whiteness Meter	-	-



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