



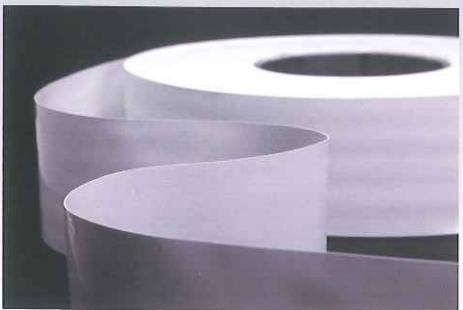
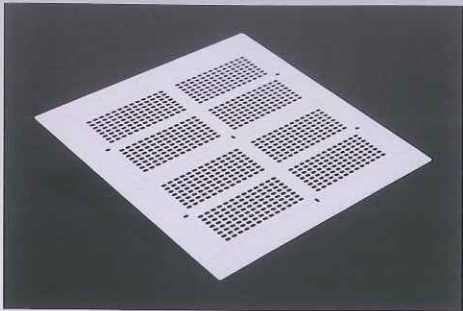
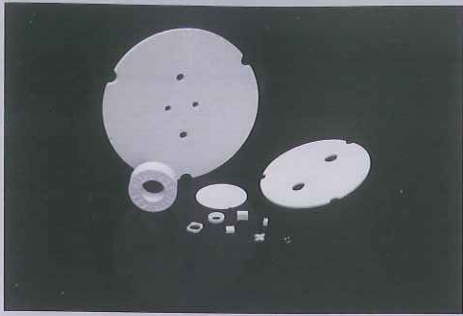
LEATEC FINE CERAMICS

INFINITIVE POWER
DRIVES US TO INNOVATE IN THE E-ERA.

LEATEC

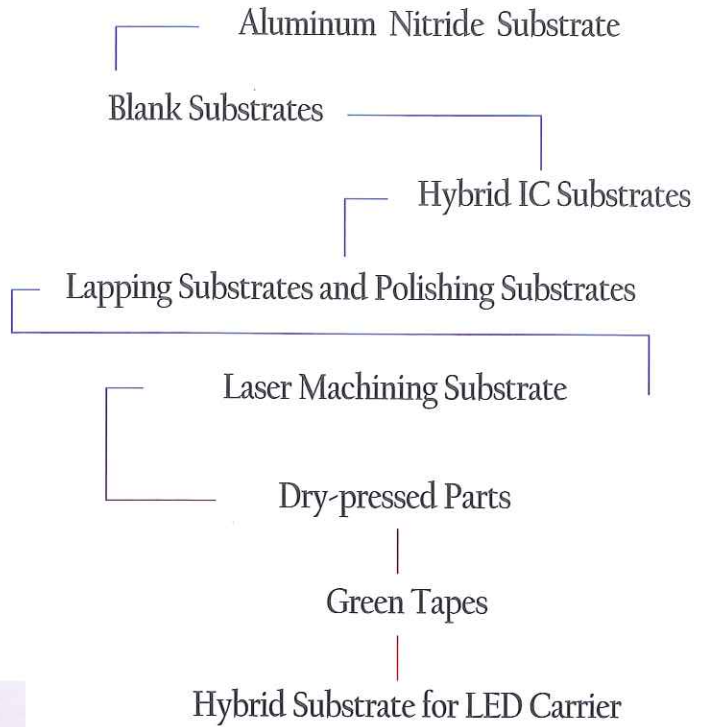
*T*echnology
*A*ttitude
*M*anagement
*E*xecution
*S*ales

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PRODUCT LIST



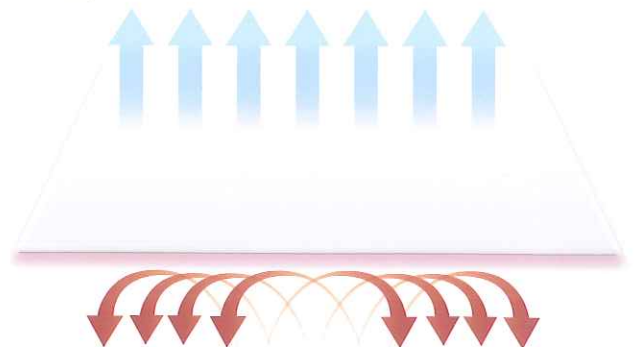
ALUMINUM NITRIDE SUBSTRATE

AlN has excellent thermal conductivity, is thus considered as high performance electronic packaging material. Leatec offers a series of substrates based on AlN materials for use in application environments. These materials are available in both lapped and "as fired" condition as well as metalized and non-metalized substrates.



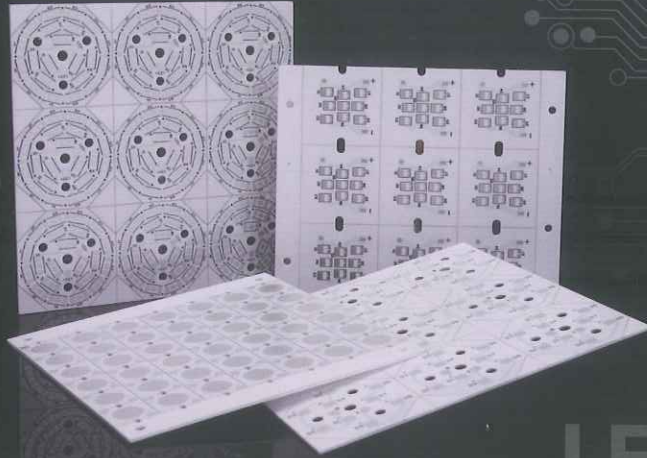
Application

- Heat dissipation substrate
- Power modules : IGBT, Inverter \ UPS.
- Laser diode : Mounting board.
- Hybrid modules : Power circuit for hybrid car.
- LED process : Bonding wafer.
- Metalization substrate : DBC, DPC



HYBRID IC SUBSTRATES

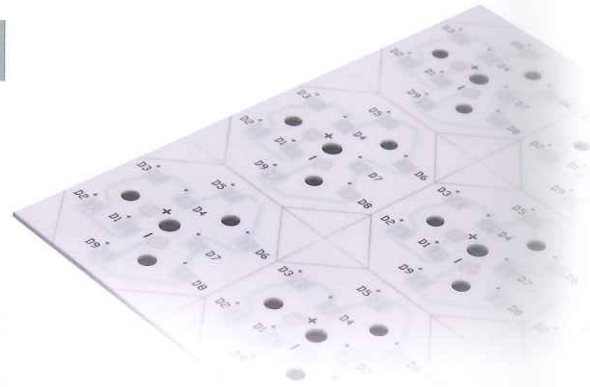
Our company has been specializing in manufacturing Ceramic Substrates, Hybrid IC Substrates, Alumina Ceramic and Fine Ceramic Products for many years. Large size substrates are supplied for HIC applications per customers' requirements. Furthermore, lapping, laser machining and metallization patterning are also available at request



LEATEC

General Dimensional Specification

Item	Standard	Premium
Dimension	Max. 4.7" × 4.7"(inch)	Max. 7" × 7"(inch)
Dimension 96% alumina	0.10 ~ 1.0 mm	0.10 ~ 1.2 mm
Dimension tolerance	± 0.8% NLT ± 0.1mm	± 0.5% NLT ± 0.08mm
Thickness tolerance	± 10%	± 0.02mm
Warp tolerance	<0.3% of length	<0.12% of length
Surface roughness	96%alumina : 0.2 ~ 0.6μm 99.6%alumina : ≤0.1μm	



LASER MACHINING DESIGN GUIDELINES

If you are interested in Laser Machining Design of Substrates, please refer to the Guidelines which are listed below.



Scribing

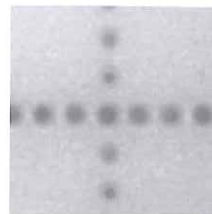
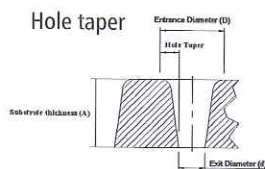
Pulse Depth	Spot Size	Depth Tolerance	Spot Pitch	Substrate Slag Height
0.1 mm	0.100 ± 0.01 mm		0.127 ± 0.015 mm	T2-T1 < 0.015 mm
0.2 mm	0.125 ± 0.01 mm	±0.05 mm	0.152 ± 0.015 mm	
0.3 mm	0.145 ± 0.01 mm		0.178 ± 0.015 mm	
0.4 mm	0.165 ± 0.01 mm	±0.078 mm	0.178 ± 0.015 mm	
0.5 mm	0.175 ± 0.01 mm			



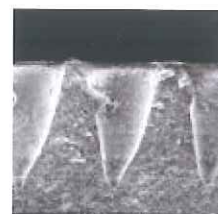
Cross Point 103x

Drilling & Cutting

Min. drilling diameter	ψ0.10mm
Roundness	<0.05 mm
Hole taper	D-d < 10% A
Substrate thickness	<1.1 mm
Cutting gap	0.100 ± 0.015 mm



Cross Point 103x



Cross Section



Slag eliminated

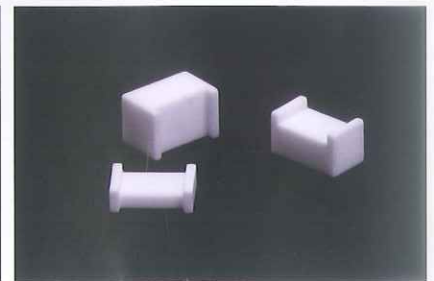
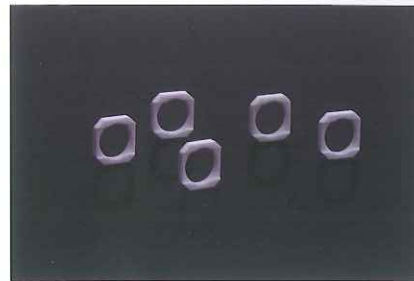
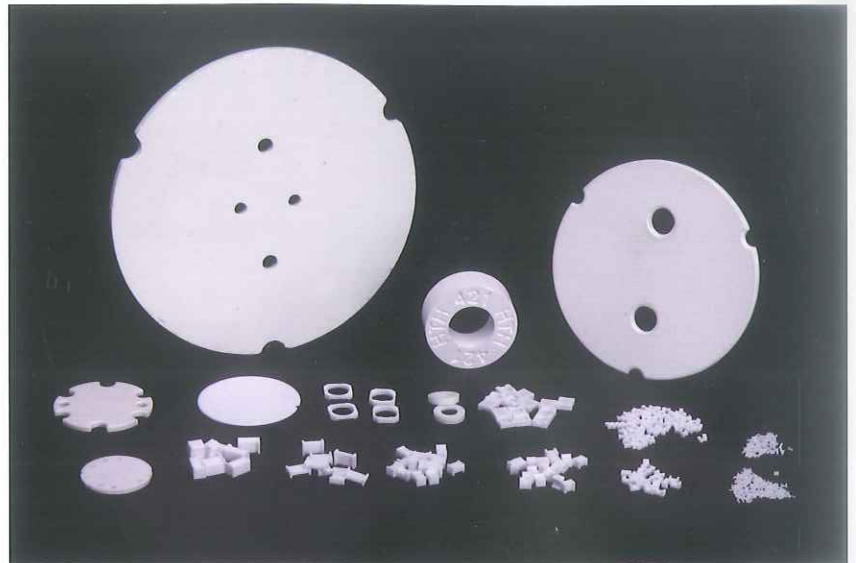


DRY-PRESS CERAMIC PARTS

Alumina is widely used in various technical applications due to its excellent characteristics. Alumina Ceramic Core Leatec provides are produced with high quality raw materials and serve quality control system.

Depending on specific type, these alumina ceramics feature a variety of properties:

- Good mechanical strength
- Good heat conductivity and fire resistance
- Good corrosion and wear resistance
- Very good electric insulation



(1) Dimension / Thickness

Type	Dimension	Thickness
Square	L 22 * W 22 mm	< 5 mm
Rectangular	L 50 * W 12 mm	< 5 mm
Circle	ψ25 mm	< 5 mm

(2) General tolerance

Range	< 0.5 mm	0.5 ~ 3 mm	3~6 mm	6~30 mm	30~50 mm
tolerance	± 0.05 mm	± 0.1 mm	± 0.2 mm	± 0.25 mm	± 0.3 mm

(3) Radius

R : 0.06 R min.

TRANSLUCENT POLY-SAPPHIRE

Translucent poly-sapphire owns good transparency and optical properties. The advantages over single crystal sapphire are low manufacturing cost, efficient production process, large size capability and complex shape. While compared to glass, the advantages are the higher strength and hardness.

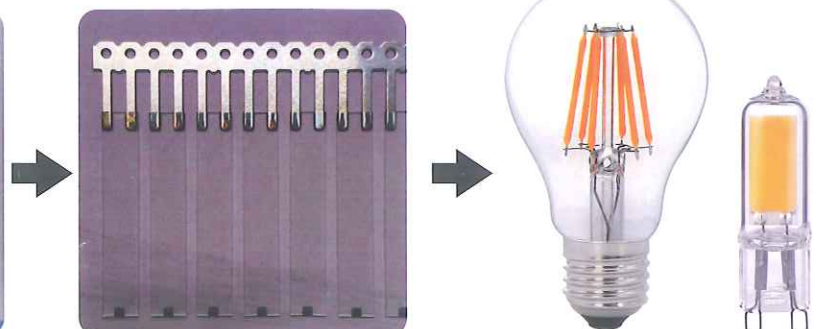
Substrate size	Dimension L*W (mm)	Thickness (mm)	Unit Size L*W (mm)
65*50	65.0×50.0	0.38±0.04	Pre-cut
65*50	65.0×50.0	0.38±0.04	Blank Substrate
94*55	94.0*55.0	0.38±0.04	Blank Substrate

九豪精密陶瓷股份有限公司
 產品企劃中心 研發部

朱智鴻 博士
 專案副理

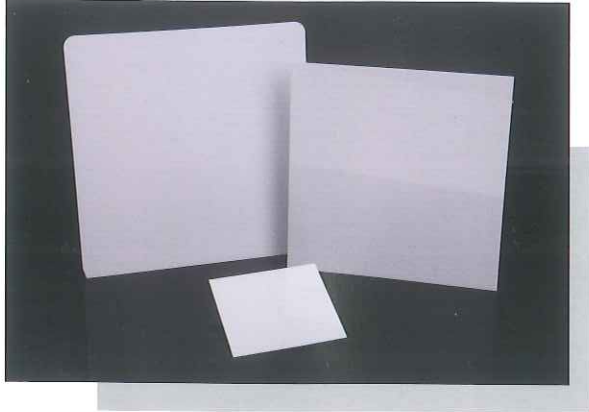
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LAPPING SUBSTRATES AND POLISHING SUBSTRATES

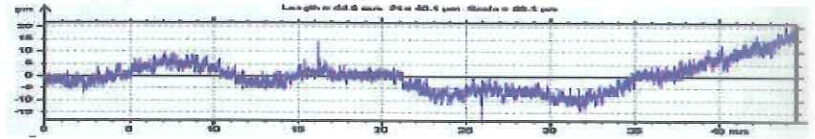


As a leading Alumina Substrates Manufacturer in Fine Ceramic Substrate Industry, we provide high quality Substrates, Lapping Substrates and Polishing Substrates.

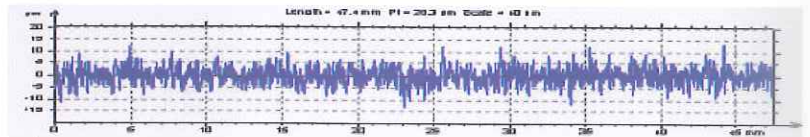
We supply highly fine surface finish substrates by lapping and polishing. Excellent flatness and thickness consistency of the substrates are very suitable for microwave substrates and solar opto-electrical products in dicing saw or printing applications.

Surface feature

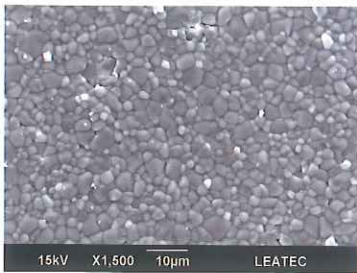
96% Al₂O₃ substrate surface characteristic



96% Al₂O₃ lapped substrate surface characteristic



ZIRCONIA TOUGHENED ALUMINA



Item	Unit	ZTA
Leatec No.		ZA
Appearance		Dense
Color		White
Reflectivity	Thickness : 0.5 mm	% 94
	Thickness : 1 mm	% 98
Bulk density	gcm ⁻³	4.05
Water absorption	%	0
Thermal characteristic	Thermal conductivity(25°C)	W/mK 25
	Coefficient of thermal expansion RT~300°C	10 ⁻⁶ /°C
	Coefficient of thermal expansion RT~500°C	
Electric characteristic	Dielectric strength	V/m > 14
	Volume resistance	Ω · cm > 10 ¹⁴
	Dielectric constant (1 MHz)	13
	Dielectric loss (1 MHz)	x10 ⁻³ 3
Mechanical characteristic	3-point Flexural strength	MPa 600

Features

- High flexural strength, up to 2 times that of Al₂O₃
- Higher reflectivity than alumina and AlN.
- Good reliability with thermal shock and thermal cycling.
- Excellent surface quality

Application

- Substrate for LED package
- High power module(IGBT...etc.)
- Substrate for automotive
- High mechanical loads
- Ultra-thin substrate
- Metalization substrate : DBC, DPC

We have rich experience in producing Blank Substrates, Al₂O₃ Substrates, Chip Array Substrates, ZTA, AlN and Fine Ceramic Substrates Materials.

Al₂O₃

Part No.	Dimension L*W(inch)	Thickness (mm)
HE3535-0110	3.5×3.5	0.25
HE4545-0010/32	4.5×4.5	0.25 / 0.80
HE4545-0012/15	4.5×4.5	0.295 / 0.38
HE4747-0310	4.75×4.75	0.25
HE4747-0311	4.75×4.75	0.28
HE4747-0314	4.75×4.75	0.36
HE4747-0316	4.75×4.75	0.40
HE4747-0320	4.75×4.75	0.50
HE4747-0325	4.75×4.75	0.635
HE4747-0330	4.75×4.75	0.76
HE4747-0332	4.75×4.75	0.80
HE4747-0340	4.75×4.75	1.00
HE5050-0116 / 20 / 40	5.0×5.0	0.40 / 0.50 / 1.00
HE5050-0515 / 20 / 25	5.0×5.0	0.38 / 0.50 / 0.635
HE5551-0140	5.5×5.1	1.00
HE7555-0015 / 25 / 40	7.5×5.5	0.38 / 0.635 / 1.00
HE7373-0140	7.3×7.3	1.00

Al₂O₃

Part No.	Dimension L*W (mm)	Thickness (mm)
HR7060	70.00×60.00	0.28±0.02
HR7465	74.00×65.00	0.20±0.02
HR7465	74.00×65.00	0.28±0.02
HR7465	74.00×65.00	0.4±0.04
HR7465	74.00×65.00	0.5±0.05
HR6049	60.00×49.50	0.10±0.01
HR7060	70.00×60.00	0.10±0.01
HR6049	60.00×49.50	0.080±0.01

AlN

Part No.	Thermal Conductivity (W/m-k)	Dimension L*W(inch)	Thickness (mm)
AN4545-10AA	170	4.5 × 4.5	0.25
AN4545-15AA	170	4.5 × 4.5	0.38
AN4545-20AA	170	4.5 × 4.5	0.5
AN4545-40BA	170	4.5 × 4.5	1.0
AN4545-60BA	170	4.5 × 4.5	1.5
AN4747-15AA	170	4.7 × 4.7	0.38
AN4747-20AA	170	4.7 × 4.7	0.5
AN7555-15AA	170	7.5 × 5.5	0.38
AN7555-25AA	170	7.5 × 5.5	0.635
AN7555-40AA	170	7.5 × 5.5	1.0

ZTA

Part No.	Dimension L*W(inch)	Thickness (mm)
ZA4545-0003	4.5×4.5	0.08
ZA4545-0004	4.5×4.5	0.10
ZA4545-0010	4.5×4.5	0.25
ZA7555-0012	7.5×5.5	0.30

Translucent poly-sapphire

Part No.	Dimension L*W(mm)	Thickness (mm)
FTCAF0940550380A1	94×55	0.38

