

THIN-FILM SUBSTRATES

The thin-film substrates are the result of the fusion of various time-tested ceramic materials and the thin-film metalizing technology developed over many years. The materials permit the production of sophisticated circuit substrates that have physical, chemical properties that meet customers' needs as well as high-degree integration and excellent electric properties materialized by thin-film metalization.



Applications

Our thin-film substrates are produced continuously from preparation of ceramic to thin-film formation, thereby permitting stable quality, low cost, and quick delivery.

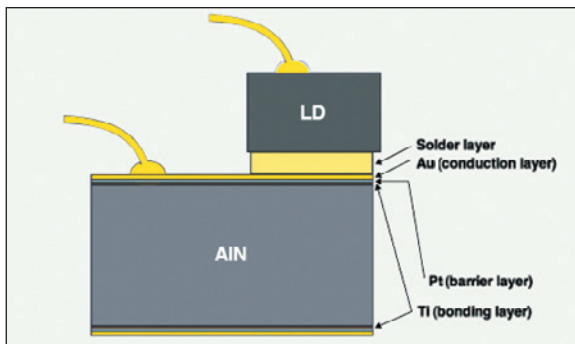
- Optical information (optical storage) and optical communication

Thanks to its high thermal conductivity, our Aluminum Nitride (AlN) can meet the needs for large heat radiation that will be demanded in future. Since the coefficient of thermal expansion is similar to that of Si semiconductors and compound semiconductors, it is widely used for applied circuit substrates in the optical market.

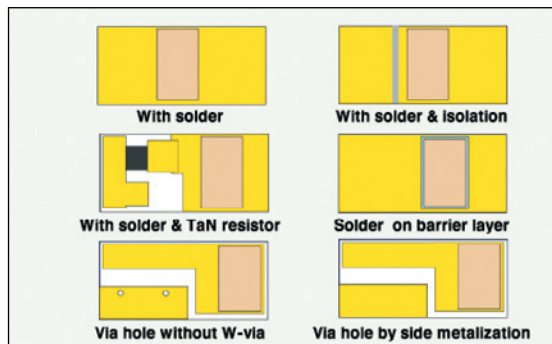
- High frequency

We are manufacturing wide-ranging dielectric materials including Alumina (Al₂O₃) and low-/high-degree dielectric materials. Fusion of the time-tested thin-film formation technology permits application to RF circuit substrates and single-layer capacitors (SLC).

Outline construction of MARUWA AlN submount



Some kinds of MARUWA submount with metalization



Ceramic materials and their general characteristics

Item	Alumina Al ₂ O ₃				AlN		Microwave dielectric ceramic	
	MA92W	MA92B	AS970	HA996	M-AlN	S-AlN		
Composition (wt%)	92	92	96	99.6	95	99		
Color	white	purple	white	white	baige	baige	Each color	
Density [g/cm ³]	3.6	3.8	3.7	3.85	3.3	3.3	3.0 ~ 5.7*	
Thermal characteristics	Coefficient of thermal expansion [ppm/°C]	7	7.3	7.3	8.1	4	4	9.6 ~ 12.3*
	Thermal conductivity [w/mK]	16	15	21.8	29.3	170	200	
Functional characteristics	Bending strength [Mpa]	320	300	320	400	450	250	
	Dielectric constant [1MHz] 25°C	9.0	9.5	9.4	9.7	9.0	9.0	7 ~ 200*
Electric characteristics	Dielectric loss [1MHz] 25°C	< 0.1%	< 0.3%	0.03%	< 0.01%	< 0.04%	< 0.03%	
	Volume resistivity [Ωcm]	> 10 ¹²	> 10 ¹²	> 10 ¹⁴	> 10 ¹³	> 10 ¹⁴	> 10 ¹⁴	
	Dielectric strength [Kv/mm]	> 10	> 10	14	18	15	15	

*Refer to individual specifications for the detailed physical properties.

