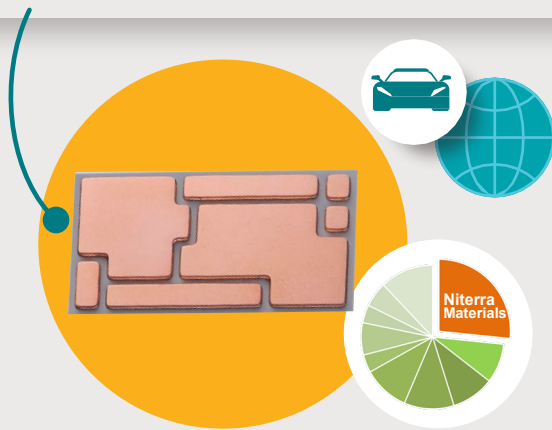


SILICON NITRIDE CERAMICS

Metallized Ceramic Substrates

High-Performance Copper Circuit Substrates with Superior Insulation and Heat Dissipation

We offer two types of substrates: a standard AMC substrate with conventional brazing material, and Ag-free SFB substrates.



Mass-Produced Since 1996

Our ceramic substrates have been used for many years in automobiles, which require high reliability, and we are confident that our substrates have proven their reliability.

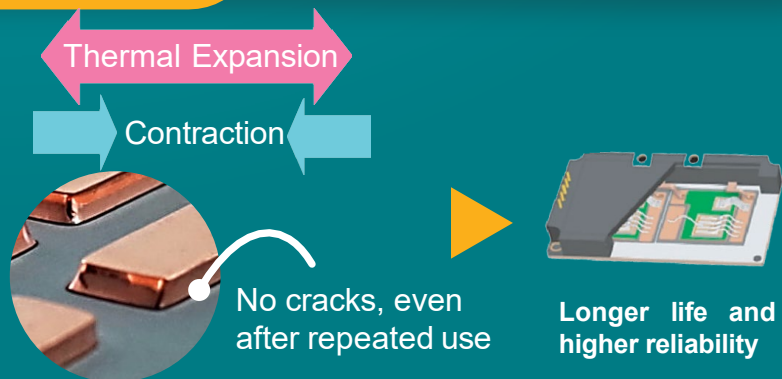
A Leading position* in the Silicon Nitride Market

We have a leading position in the silicon nitride market. Recent investments in manufacturing facilities have further increased our production capacity. *company data

Benefit Points

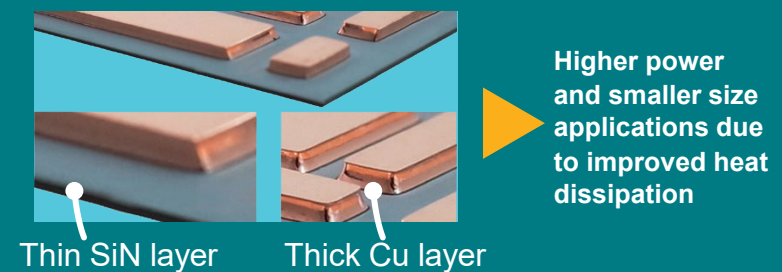
▶ High Reliability (High Heat Cycle Resistance)

Silicon nitride ceramics have excellent mechanical properties. It is difficult to crack even if exposed to thermal expansion and contraction under repeated use.



▶ High Heat Dissipation by Thick Copper and Thin SiN

Making use of excellent mechanical properties of silicon nitride ceramics, bonding of thick copper and thinning of SiN are possible. It contributes to reduction in thermal resistance and inductance.



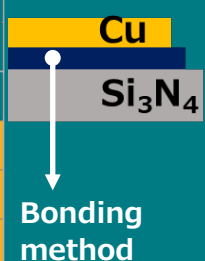
▶ Can be selected from two types of brazing composition

We offer two types of copper circuit substrates: our standard AMC and Silver-free SFB.

Both provide exceptional heat dissipation and thermal cycle performance, allowing us to deliver the ideal solution tailored to your specific design rules and operating environments.

+++ = MAX

Items	SiN-AMC	SiN-SFB
Bonding method	Ag-Cu-Ti (Brazing)	Ag Free (Brazing)
Heat Dissipation	++	++
Thermal Cycle Performance	+++	+++
Migration Characteristic	+	+++
Design flexibility	+++	++
Cost	++	+++

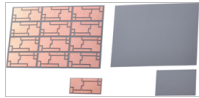


Evolution and Future Roadmap of High-Thermal-Conductivity SiN Technology



We have been researching ceramics for **Over 50 years**. Our strength lies in our deep knowledge of materials, backed up by our experience and achievements.

1995



Development of high thermal conductivity SiN.

1996



Start of mass production of industrial application.

2007



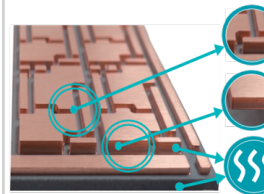
Start of mass production of automotive application.

2015



Adopted to Toyota Prius' Power Control Unit.

2026~



Narrow pattern GAP

- Implemented with copper circuit thickness of 0.8mm or greater.

Thicker Cu brazed

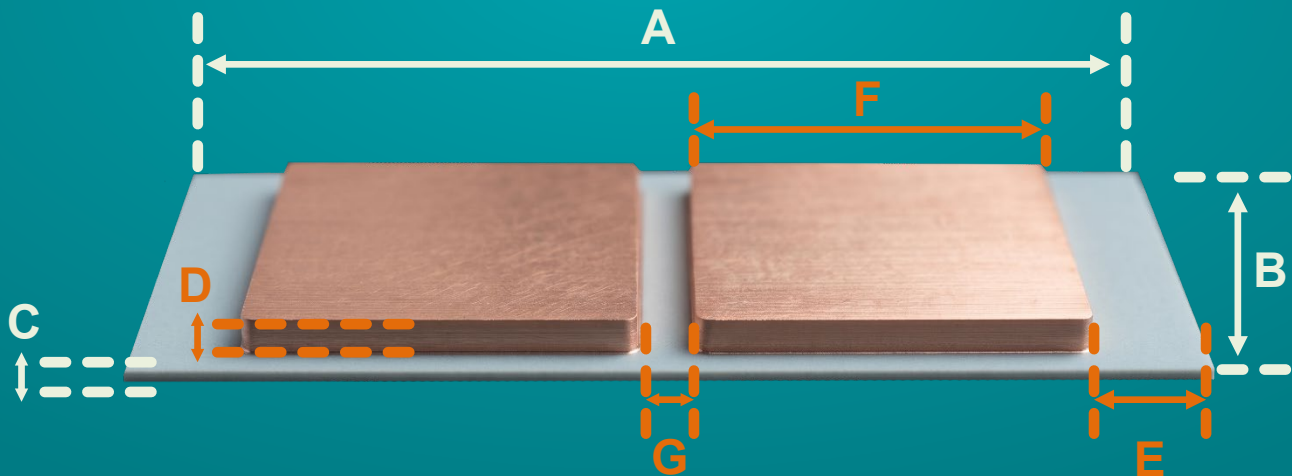
- Standardized 1.2mm copper circuit thickness.

Thermal conductivity improved:

- Advanced copper bonding
- High-thermal-conductivity SiN substrate

20XX...

Copper Circuit Pattern Design Guide



Example figure	Parameters	D (Cu Thickness)		
		0.3mm	0.5mm	0.8mm
A	Long edge of the (individual) substrate	1 0 ~ 1 7 0 mm		
B	Short edge of the (individual) substrate	1 0 ~ 1 3 0 mm		
C	Silicon nitride substrate thickness	0.25, 0.32, (0.635mm)		
D	Cu Thickness	0.3mm~0.8mm		
E	Space to edge (Insulation distance width)	Min. 1.2 (Min. 0.4)	Min. 1.2 (Min. 0.5)	Min. 1.2 (Min. 0.7)
F	Cu pattern width	Min. 0.5	Min. 1.5	Min. 2.0
G	Cu pattern distance width	Min. 0.5	Min. 1.3	Min. 1.7

For more information:

<https://www.niterramaterials.co.jp/en/index.htm>

