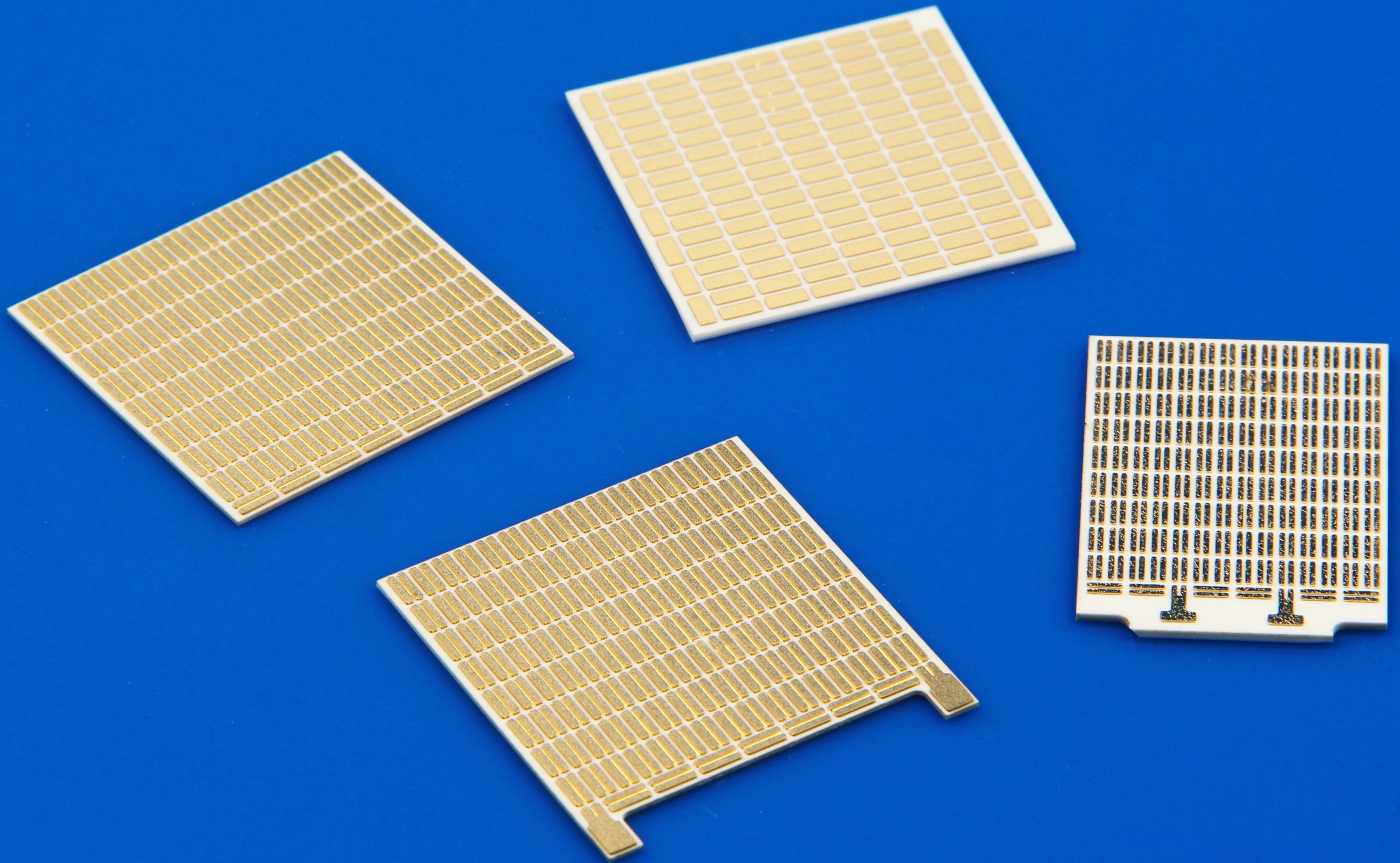


DBC Substrates

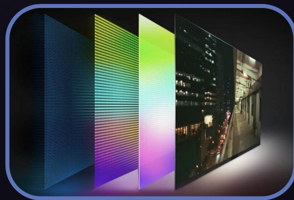
Overview

DBC substrate, short for Direct Bonded Copper substrate, is an advanced material composed of a ceramic substrate (typically Al_2O_3 or AlN) and copper, tightly joined together through a hypo-eutectic process. This unique combination of materials results in a substrate with exceptional thermal conductivity, low thermal expansion, high strength, and excellent wettability for soldering applications.

Automotive

Power Electronics

Home Appliance


Industrial

Aerospace

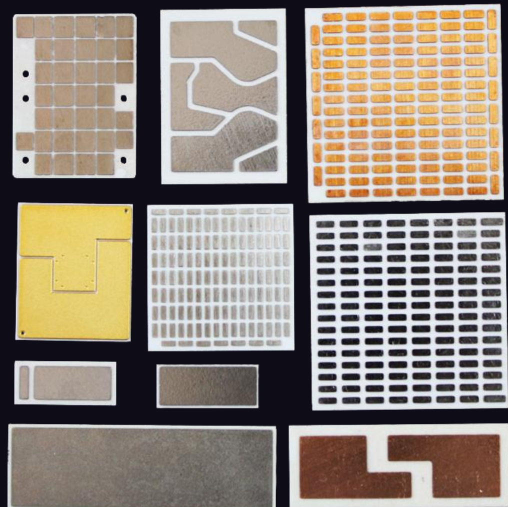
Environmental Technology

PC/IT

Applied Area

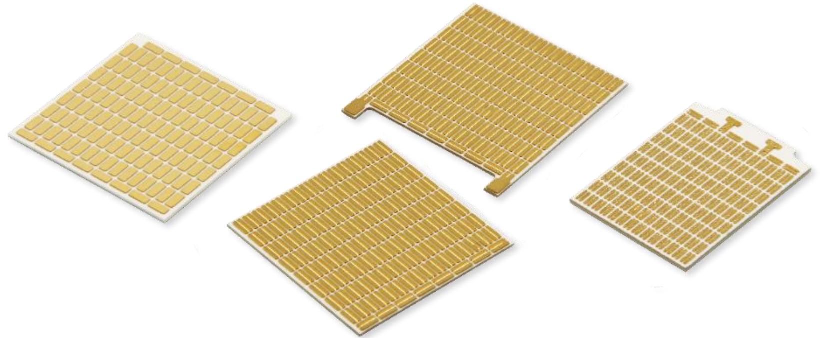
- Automotive: ABS, Power Steering, DC/DC Converter, LED Lighting, Ignition Control
- Power Electronics: IGBT, MOSFET, Thyristor Module, Solid-state Relay, Diode, Power Transistors
- Home Appliance: Air Conditioner, Peltier Cooler
- Industrial: LED Displays, Welding Machine
- Aerospace: Laser, Power Supply for Satellites and Aircrafts
- Environmental Technology: Local Power Generation, Electric Vehicle, Traction Control System, Photovoltaic Units, Wind Power
- PC/IT: Power Supply, UPS System

DBC Substrates

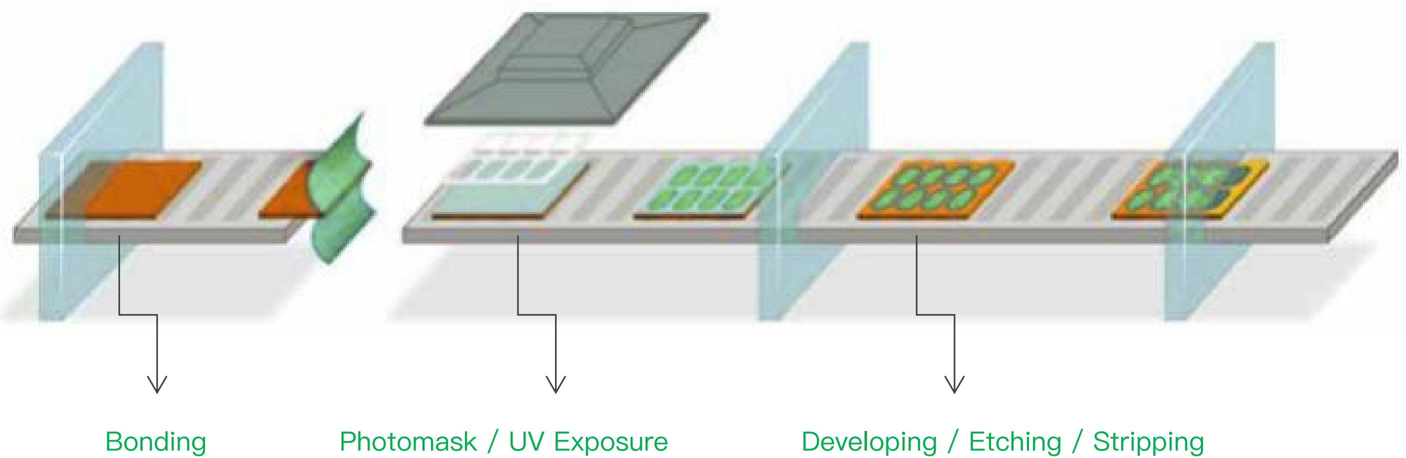


Ceramic Materials Properties

1. High Thermal Conductivity
2. Low Thermal Expansion
3. High Strength
4. High Wettability for Solder



Patterning Process



Material Specification & Properties

Item	Unit	Al_2O_3	ZTA	AlN
Content	%	96%	90% Al_2O_3 9% ZrO_2	–
Density	g/m^3	3.75	3.95	3.3
Thermal Conductivity	W/m.K	>24	>27	>170
Electrical Resistivity	Ω·cm	>10^{14}	>10^{14}	>10^{14}
Dielectric Constant	1Mhz	9.8	10.5	9.0
Dielectric Strength	KV/mm	>20	>20	>20
Dielectric Loss	1Mhz	0.0003	0.0003	0.0005
Bending Strength (Σ0, M>10)	MPa	>350	>600	>350
Young's Modulus	GPa	340	310	320
Coefficient of Thermal Expansion	–	6.8 (20~300℃)	7.5 (40~400℃) 8.4 (40~800℃)	4.7 (20~300℃)

DBC Design Guide

Item	Unit	Value
Master Card Size	mm	138x190 ±1.5%
		USABLE AERA 127×178
Dimension Tolerance	mm	+0.2/−0.05
Copper Edge to Ceramic Edge	mm	±0.15
Pattern Mismatch	mm	⩽0.2
Etch Factor	–	＞2
Chip	t	L : max.1, W&D : 0.5
Total Thickness	%	±7
Surface Roughness	μm	R_{max}=50 ; Ra⩽3 ; Rz⩽16
Plating Thickness	μm	Au: 0.01~0.1； Ni: 2~8

Available Material Thickness and Combination

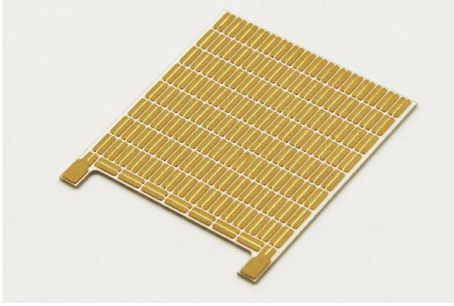
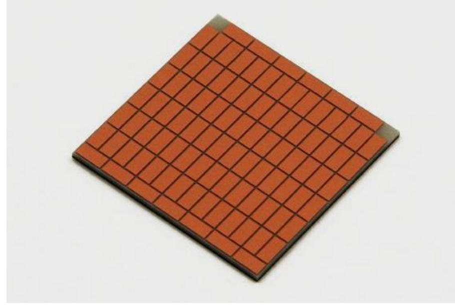
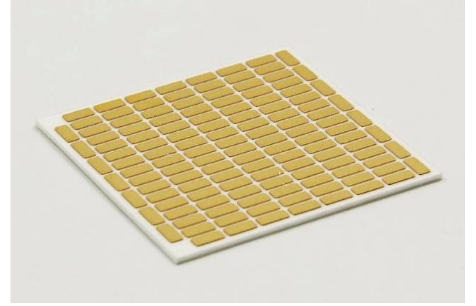
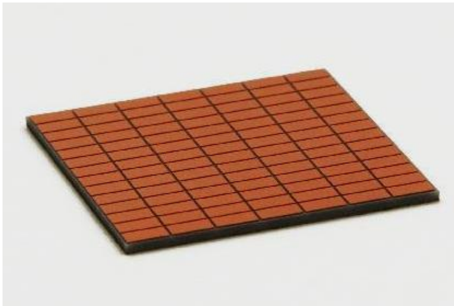
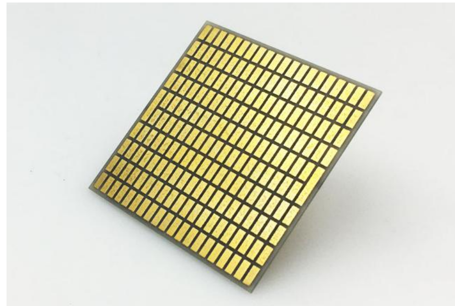
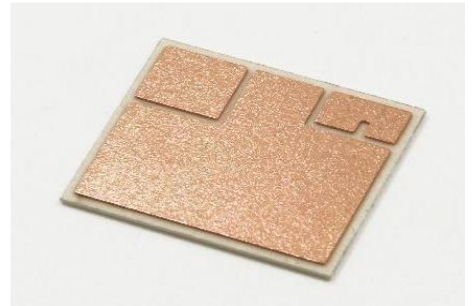
96% Al_2O_3	Copper Thickness					
Thickness	0.127	0.2	0.25	0.3	0.4	0.5
0.25	√	√	√	–	–	–
0.32	√	√	√	√	–	–
0.38	√	√	√	√	–	–
0.5	√	√	√	√	√	√
0.635	√	√	√	√	√	√
1.0	√	√	√	√	√	√

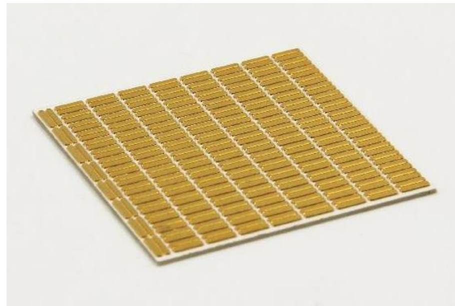
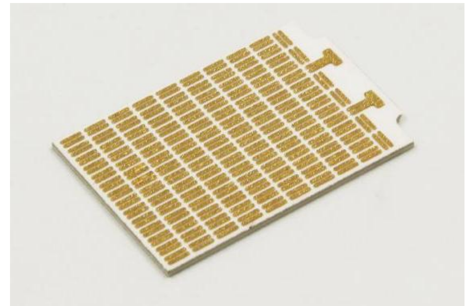
ZTA	Copper Thickness					
Thickness	0.127	0.2	0.25	0.3	0.4	0.5
0.25	√	√	√	√	–	–
0.32	√	√	√	√	√	√

AIN	Copper Thickness					
Thickness	0.127	0.2	0.25	0.3	0.4	0.5
0.38	√	√	√	√	–	–
0.5	√	√	√	√	√	√
0.63	√	√	√	√	√	√
1.0	√	√	√	√	√	√

This specification is only a reference for customized designs.
The parameters are standard . For any special needs please contact with us.

Show Case

0086 592 558 9730 sales@innovacera.com www.innovacera.com

XIAMEN INNOVACERA ADVANCED MATERIALS CO.,LTD

Block A, 6/F, No.588 Jiahe Road, Torch High-tech Industrial District, Xiamen, China