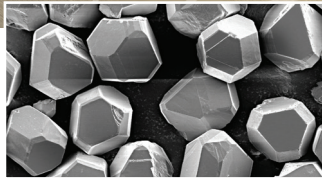


Aluminum Diamond Composites

for Microelectronics and Optoelectronics



Aluminum Diamond for Heat Spreaders, Flanges, Pills, Laser Mounts, Submounts

Superb thermal dissipation and matched thermal expansion to semiconductor dies make Aluminum Diamond the material of choice for packaging highly thermal demanding microelectronic and optoelectronic applications.

NMIC Aluminum Diamond heat spreaders provide attractive solutions to your most demanding packaging needs with thermal performance reaching 500 W/mK and a thermal expansion of 6.1 ppm/K (40 - 100°C).

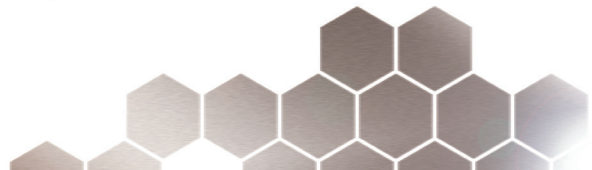
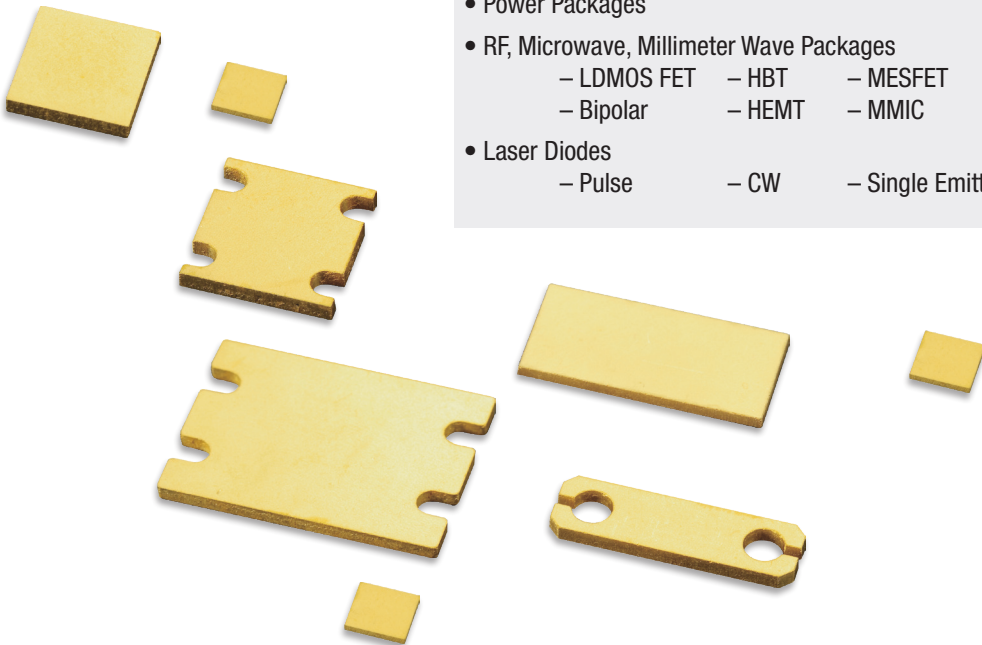
NMIC Aluminum Diamond heat spreaders are expansion matched for active semiconductor materials such as Si, GaN, GaAs, SiC.

BENEFITS

- Thermal conductivity reaching 500 W/mk
- CTE matched to various semiconductor materials
- Heat spreaders provided with Ni/Au electrolytic or electroless plating
- Exceptional tolerance, surface roughness, and flatness
- In-house production capability guarantees rapid prototyping and sample turnaround
- Engineering staff available to help custom design components for your application
- Flat, irregular, and multi-step geometries possible

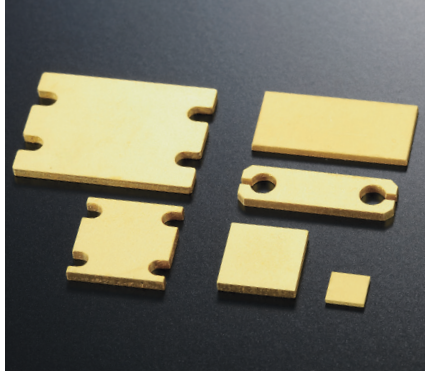
APPLICATIONS

- Power Packages
- RF, Microwave, Millimeter Wave Packages
 - LDMOS FET
 - HBT
 - MESFET
 - Bipolar
 - HEMT
 - MMIC
- Laser Diodes
 - Pulse
 - CW
 - Single Emitters Bars

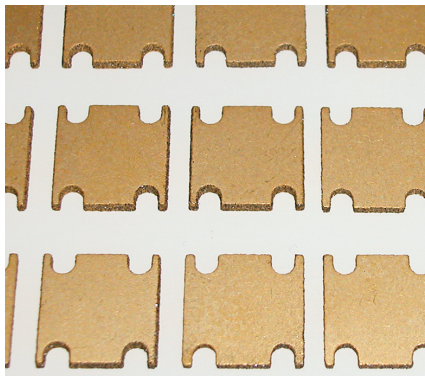


Aluminum Diamond Composites

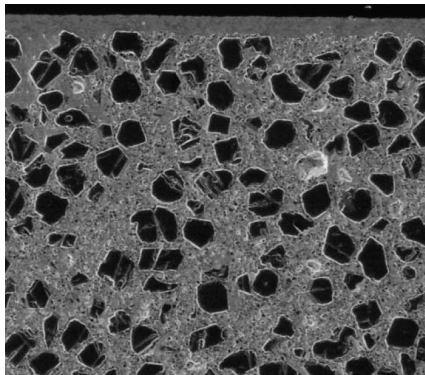
for Microelectronics and Optoelectronics



Ni and Au plated Aluminum Diamond heat spreaders



Aluminum Diamond heat spreaders



Aluminum Diamond microstructure

NMIC Aluminum Diamond AS-D60 Material Properties*

Thermal Conductivity500 W/mK (thickness dependent)

Thermal Expansion (CTE)

40–100°C6.1 ppm/K

40–200°C7.1 ppm/K

40–300°C7.9 ppm/K

Density3.10 - 3.26 g/cc

Flexural Strength300 MPa

Modulus340 GPa

Specific Heat0.62 J/gK

Electrical Resistivity $\leq 3.7 \times 10^{-7}$ ohm·m

NMIC Aluminum Diamond AS-D60 Dimensional Properties*

Dimension Range

Max45 mm x 45 mm

Min3 mm x 3 mm

Thickness Range $0.5 \text{ mm} \leq t \leq 2.0 \text{ mm}$

Tolerances

Dimension $\pm 0.05 \text{ mm}$

Thickness $\pm 0.05 \text{ mm}$

Flatness and Parallelism

Flatness100 μm

Parallelism200 μm

Surface Roughness (Ra)

After Plating $\leq 0.84 \mu\text{m}$

NMIC Aluminum Diamond AS-D60 Plating Properties*

Base Plating

Ni4.0 μm

Final Plating

Au2.0 μm

* Above properties are representative. Actual values are based on material thickness and customer configuration.



NANO MATERIALS
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