



Fully inorganic substrate for COB LED and LED chip packaging

Nanoceramic thin-film substrate

Overview

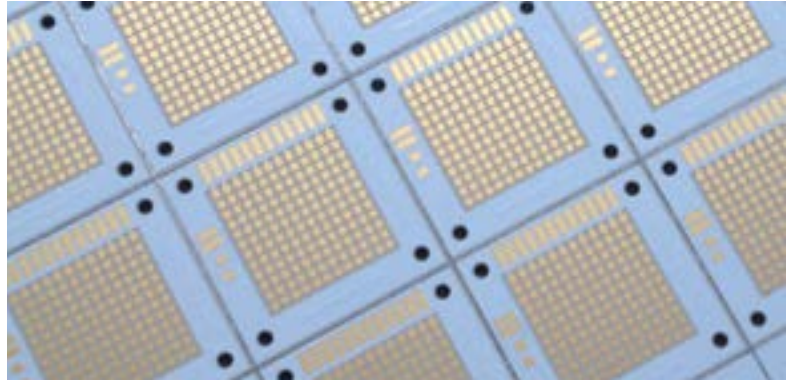
- Fully inorganic Nanoceramic high thermal conductivity MCPCB
- Form-fit-function replacement for aluminium nitride
- Composite thermal conductivity: 152 W/mK (single-sided)
- Through thickness (0.5 mm) thermal resistance: 0.04°C.cm²/W
- Nanoceramic dielectric thermal conductivity: 7.3 W/mK
- Double-sided with optional through vias (composite thermal conductivity: ~100 W/mK)
- Maximum operating temperature: 350°C
- Pb-free solder compatible
- ROHS compliant

Applications

Nanotherm DM is designed for LED applications where thermal management is critical.

- Level 1 LED packaging substrates
- Chip on Board LED & CSP substrates
- High density LED modules
- UV LED modules

Call us now for a quote:
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Nanotherm DM is an innovative thin-film substrate designed for use in LED applications where thermal management is critical. It contains no organic material* and provides comparable thermal performance to aluminium nitride.

A patented process converts the surface of aluminium to an extremely thin Nanoceramic dielectric layer with high thermal conductivity. Direct metallization of the Nanoceramic results in a wholly inorganic substrate.

The combination of the thinnest dielectric layer in the industry with the highest thermal conductivity yields the lowest thermal resistance of any Metal Clad PCB (MCPCB) material.

- Nanotherm DM substrates are suitable for demanding LED applications where extreme thermal challenges are created by high temperature and power density.
- Nanotherm DM substrates dissipate heat generated by electronic devices with similar efficiency to aluminium nitride but with the robustness, formability, panel dimensions and weight advantages of an aluminium PCB. Through being inorganic, further attributes are high operating temperature, lifetime stability and low outgassing.
- Nanotherm DM substrates can incorporate through vias. The Nanoceramic dielectric coats uniformly all exposed aluminium, creating an insulating sleeve on the inside of all pre-drilled features. Direct metallisation then provides a conductive path between circuits on both sides of the PCB.

* subject to solder mask type



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Nanotherm DM capabilities (standard product)

Cambridge Nanotherm manufacture circuitised substrates via a network of approved thin-film subcontractors. We offer a range of different circuitisation options to meet your requirements, from fast turnaround prototyping to mass production.

Substrate capabilities (standard product)	
Tile size	4 x 4" and 7.5 x 5.5" (98.30 x 98.30 / 122 x 174.5 mm)
Sidedness	Single, dual sided (different circuit on each side) or double sided interconnected by vias
Base metal	Aluminium alloy 6061-T6 (0.5 mm) 6082-T6 (1.0 - 1.5 mm)
Base metal thickness	0.5, 1.0, 1.5mm
Copper weight	0.5 - 2 oz (17.5 - 70 µm thickness)
Track	75 µm (1 oz copper) 150 µm (1.5 oz copper)
Gap	1.5 x copper thickness
Via hole (mechanically formed)	> 200µm, registration ±100 µm
Filled via (laser drilled)	100 µm Ø solid electroplated copper fill, registration ±20 µm
Surface finish	Immersion & electroplated silver, OSP, ENIG, ENEPIG, electroplated nickel-gold
Solder mask	Taiyo PSR 4000 LEW-3, LED white
Singulation	V-score, routing, dicing
Silk screen	Black. White and yellow also available for higher volumes
Laser barcoding	Available
Test	Open/short, withstand
Inspection	IPC-A-600H Class 2 or AABUS
Drawings	Layered DFX format

- Nanoceramic is atomically bonded to the metal base and is not prone to delamination after thermal cycling -40°C to +250°C, 100 cycles, 24 hours/cycle.
- Depending on the thickness of the Nanoceramic dielectric layer the withstand voltage can range from 50 to 1,500 Vdc.
- The Nanoceramic dielectric layer can be applied on one or both sides of the aluminium based PCB and used to construct single- or double-sided circuits