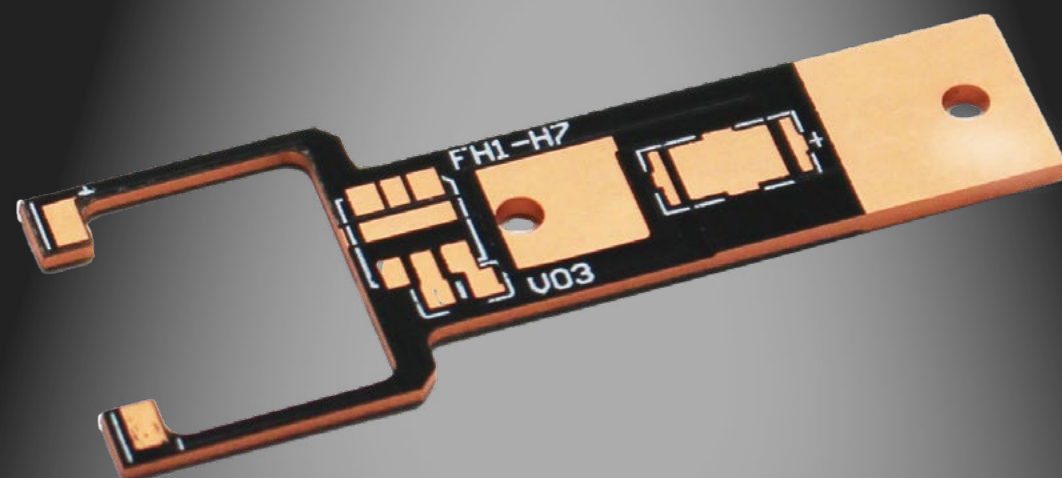


ALUMINUM-NITRIDE PCB

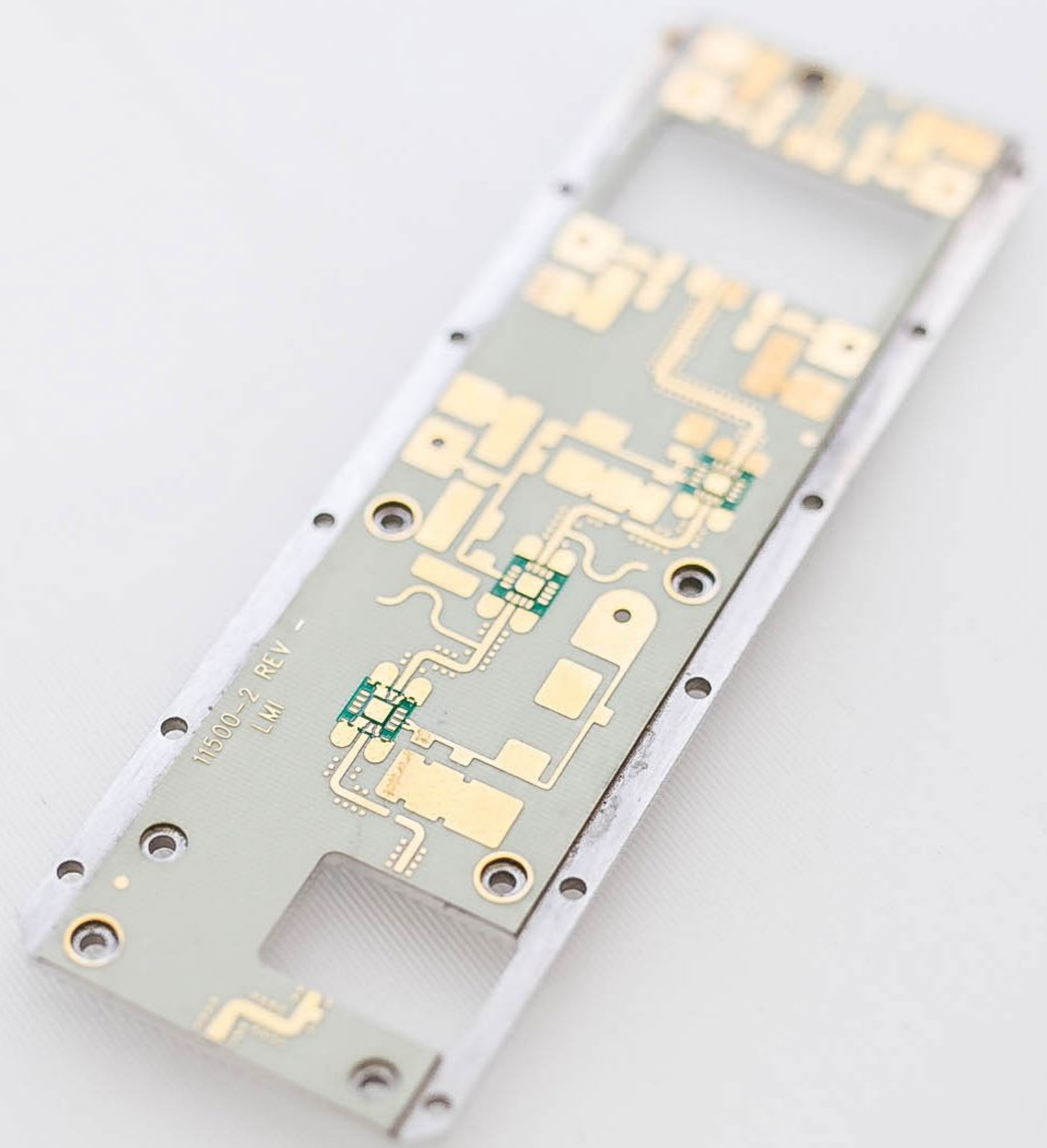


AlN PCB

What is a AlN PCB?

An AlN PCB (Aluminum Nitride Printed Circuit Board) is a type of ceramic PCB that uses Aluminum Nitride (AlN) as its substrate material. It's known for its exceptional thermal conductivity and electrical insulation properties, making it ideal for high-performance applications.

For high thermal conductivity, aluminum nitride boards are ideal, providing greater than 150 w/mK. Since aluminum nitride boards are expensive, however, those opting for less expensive ceramic PCBs may find themselves with aluminum oxide boards, which offer about 18-36 w/mK. Both types will provide better thermal performance than metal-core printed circuit boards because there is no need for an electric layer between the core and the circuits. Printed circuit boards with gold plating to protect the exposed pads if silver corrosion may be a problem, such as in high sulfur environments.



AlN PCB

MAIN CERAMIC PCB TYPES

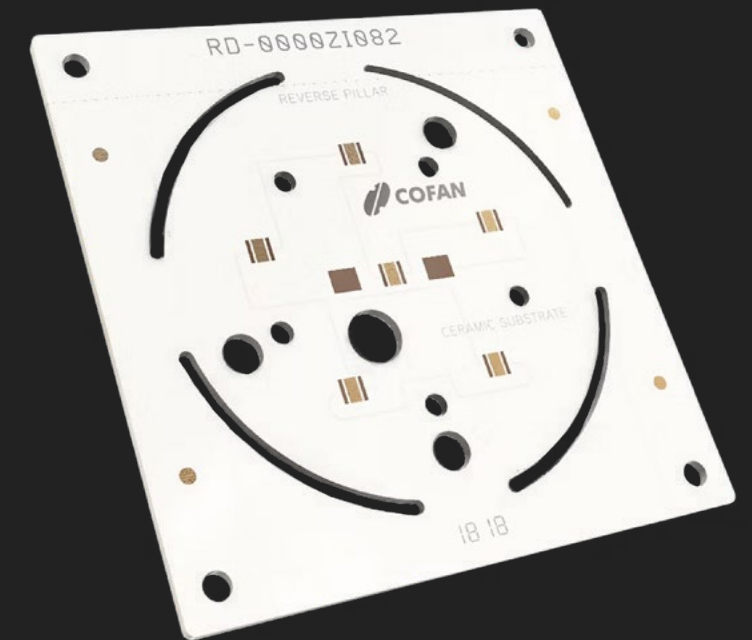
Ceramic PCBs are usually made up of ceramic cores, with alumina and aluminum nitride (AlN) being two of the primary types. Both of these kinds of boards provide better thermal performance than metal core PCBs because there isn't a need for an electric layer between the core and the circuits.

Find out more about these two main kinds of ceramic PCB types below:

1) AlN: For high thermal conductivity, aluminum nitride boards are ideal, providing greater than 150 w/mK.

AlN is a top choice for many other reasons as well, such as its good dielectric properties, non-reactiveness with various semiconductor process chemicals and low CTE.

2) Alumina: Since aluminum nitride boards are expensive, those opting for less expensive ceramic PCBs may find themselves with Alumina boards. These PCBs are made out of aluminum oxide and offer about 18-36 w/mK.



CERAMIC PCB THERMAL CONDUCTIVITY

High ceramic PCB thermal conductivity is probably the leading reason more industries are turning to ceramics in their PCBs and packages, as this base material has a clear edge over traditional materials in this regard. Better CTE matching and hermetic sealing only add to the appeal of these materials.

The challenge is that ceramic base material and the boards your PCB manufacturer makes from them, are considerably more expensive than materials for traditional PCBs, which can add up significantly over the length of a high-volume job. However, the benefits of ceramic boards and the need for heightened thermal conductivity are so great that any company that can afford to use ceramic boards will probably do so out of necessity.

CERAMIC PCB MANUFACTURING

DPC Ceramic Substrate Manufacturing Process

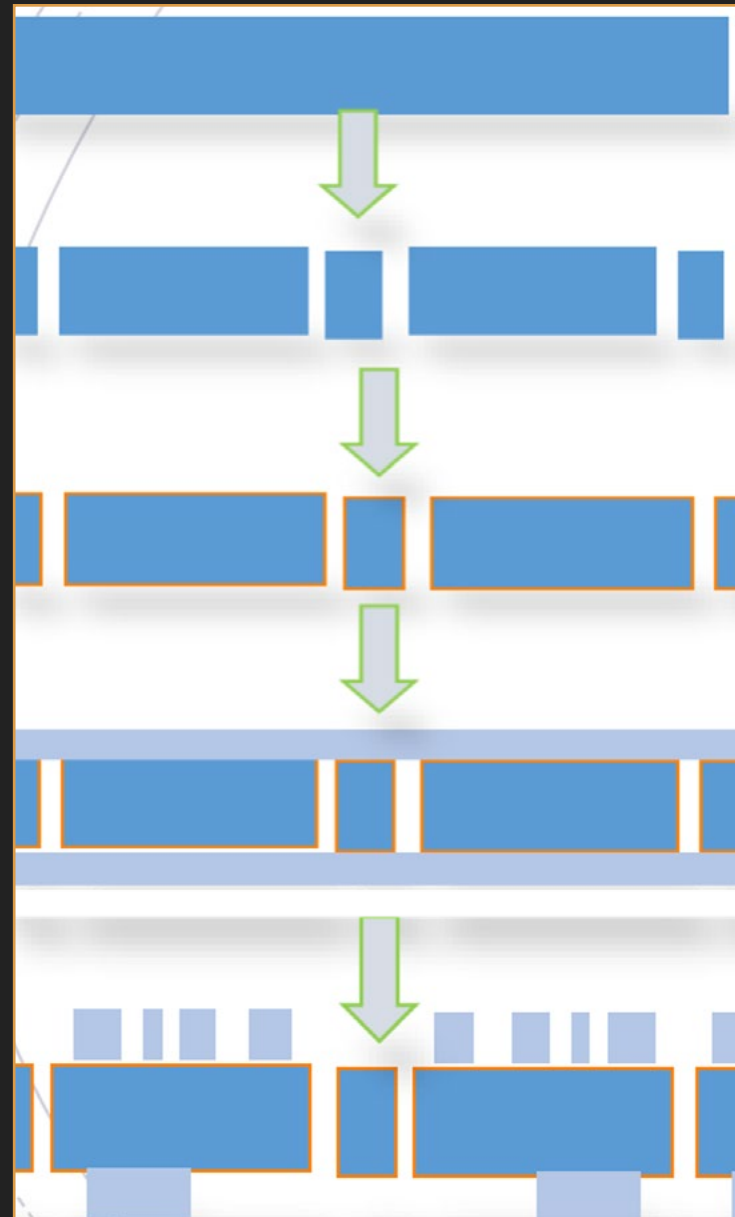
Ceramic Substrate $\text{Al}_2\text{O}_3/\text{AlN}$

Step 1: Laser Drilling

Step 2: Cu Sputter deposition

Step 3: Apply photoresist coating

Step 4: Circuit pattern exposure and development

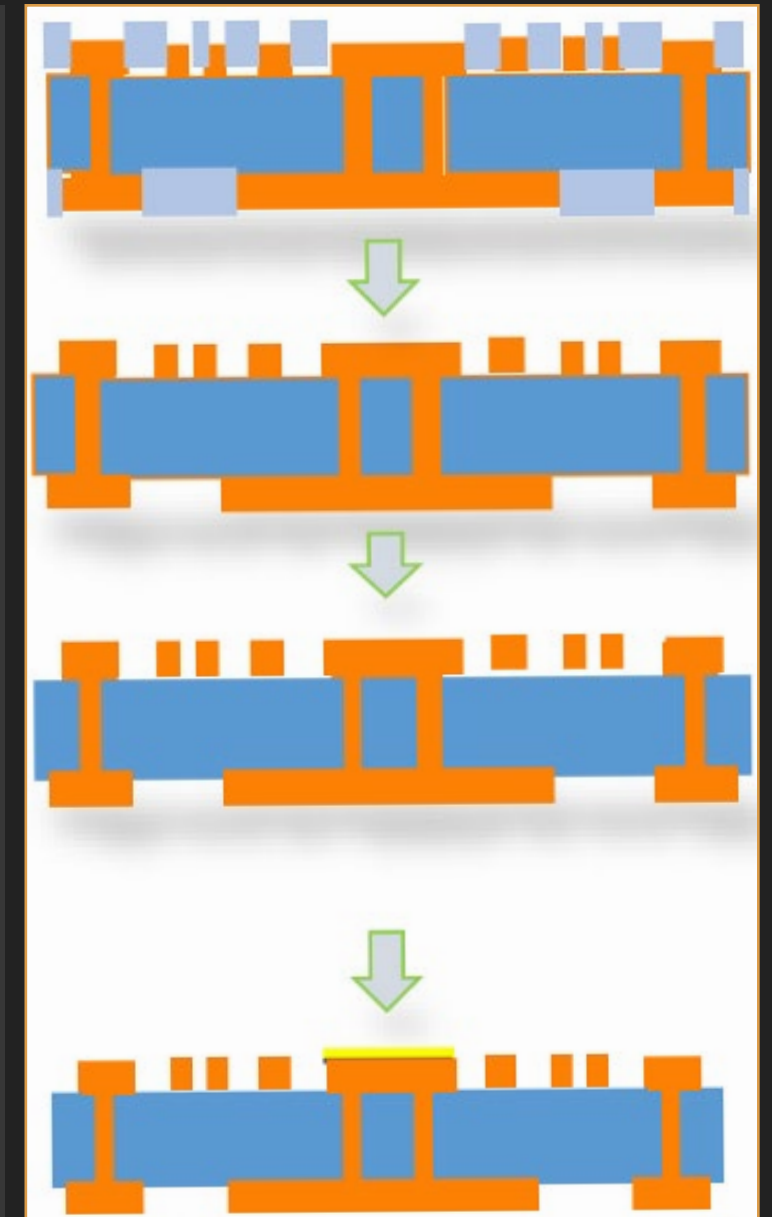


Step 5: Electroplating Cu

Step 6: Remove photoresist

Step 7: Grinding and Polishing

Step 8: Ni/Au/Ag plating



AlN PCB APPLICATIONS

Automotive

- Used in power inverters, battery management systems (BMS), and motor controllers.
- AlN PCBs help dissipate heat efficiently, ensuring IGBT modules and MOSFETs operate within safe temperature ranges.



Electronics

- Used in IGBT (Insulated Gate Bipolar Transistor) modules, power converters, and inverters.
- Ensures efficient heat management, reducing failure rates and improving reliability.



Medical

- Applied in imaging devices, lasers, and high-frequency medical equipment.
- Ensures reliable operation with minimal heat-induced performance degradation.



AlN PCB APPLICATIONS

Heavy Machinery

- Used in motor drives, industrial robots, and CNC machines.
- AlN PCBs efficiently dissipate heat from IGBT modules and MOSFETs, ensuring motors run smoothly without overheating.



LED Lighting

- Applied in high-brightness LED modules for automotive headlights, stadium lights, and industrial lighting.
- AlN PCBs prevent overheating, extending the lifespan of LED components.



Aerospace

- Used in mission-critical systems that require high thermal and mechanical stability.
- Suitable for avionics, military radar, and space applications.



CERTIFICATIONS

- ISO 9001:2015
- ISO 14001:2015
- ISO 45001:2020
- IATF 16949:2016
- Reach-SVCH Statement
- RoHS Compliance Certificate
- ITAR

ISO 9001:2015
COFAN Dongguan



ISO 9001:2015
COFAN Taiwan



ISO 14001:2015
COFAN Dongguan



ISO 14001:2015
COFAN Taiwan



ISO 45001:2020
COFAN Dongguan



IATF 16949:2016
COFAN Taiwan



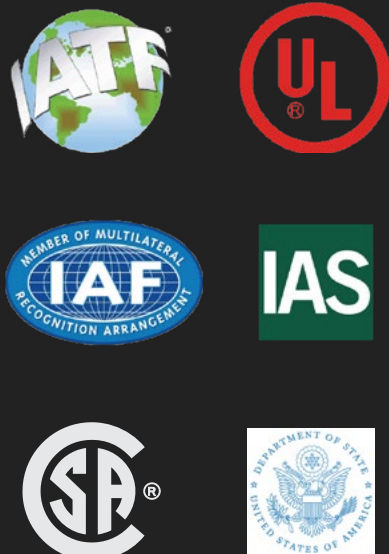
ITAR
COFAN USA

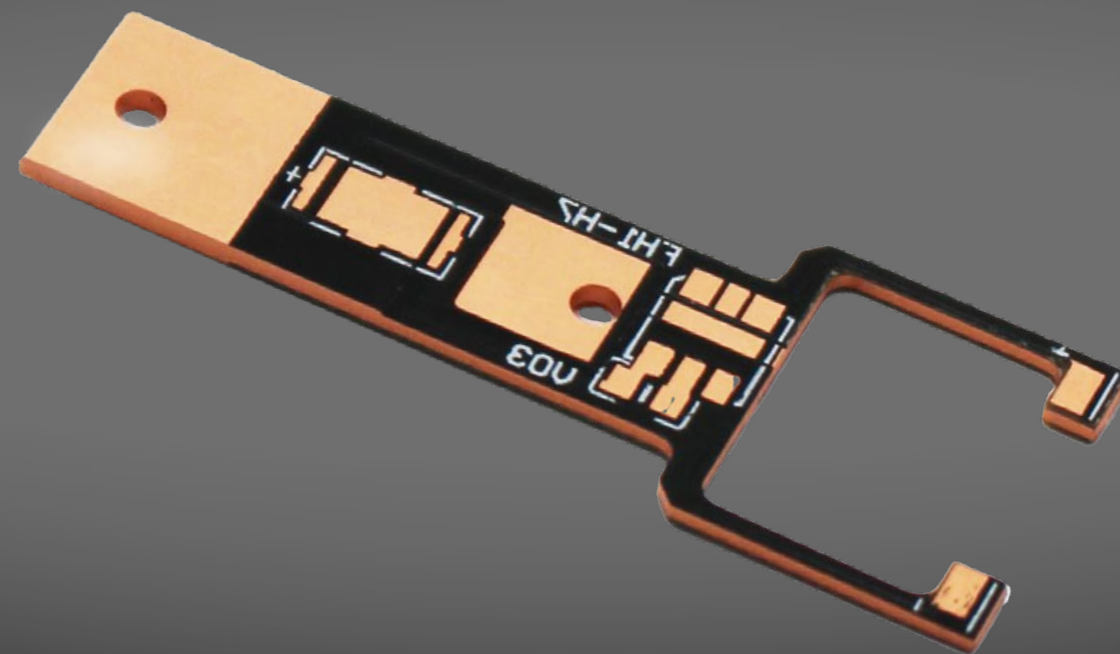


Reach-SVCH
Statement



RoHS-Compliance Certificate
Cofan Taiwan





Cofan Head Office (Dallas, Texas)

- 4929 W Royal Ln, Irving, Texas 75063
- E-mail: info@cofanthermal.com
- Tel: 1-800-766-6097

Cofan USA (Fremont, California)

- 46177 Warm Springs Blvd. Fremont, CA 94539
- E-mail: info@cofanthermal.com
- Tel: 1-510-490-7533

Cofan Canada (Toronto, Ontario)

- 71 Buttermilk Ave, Vaughan, ON L4K 3X2
- E-mail: info@cofan-pcb.com
- Tel: 1-877-228-3250

Our Website

- www.cofanthermal.com
- www.cofanthermal-pcb.com

