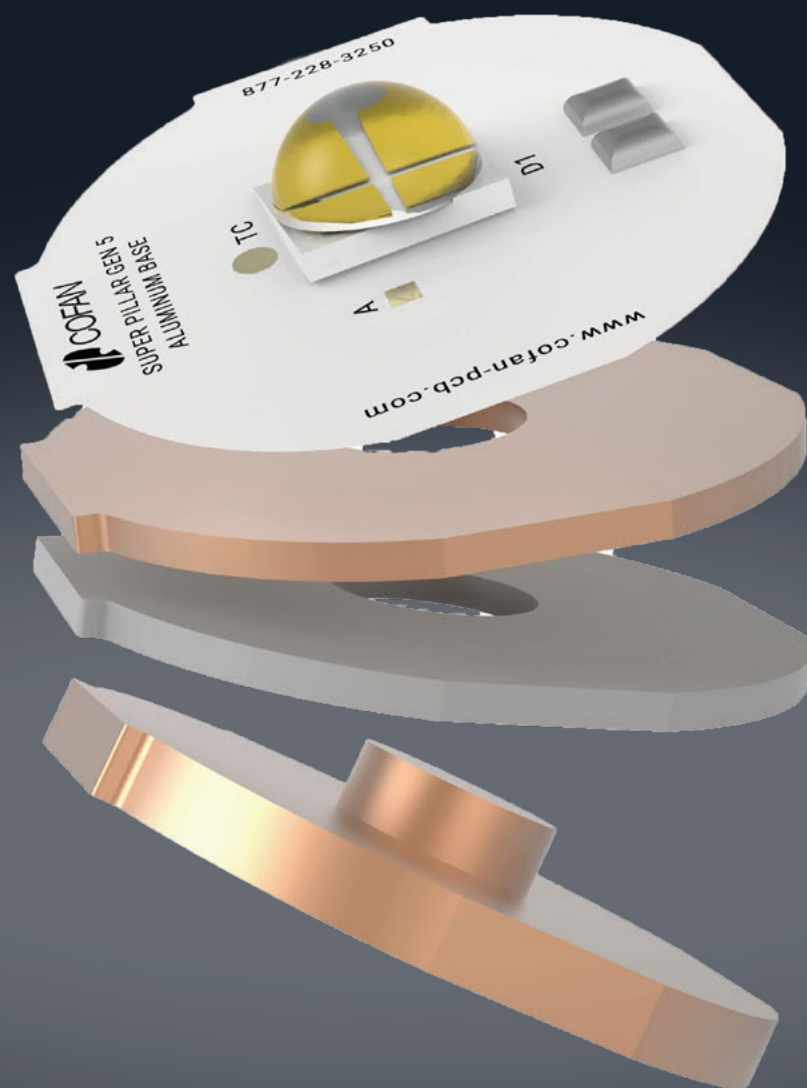


SUPER PILLAR™

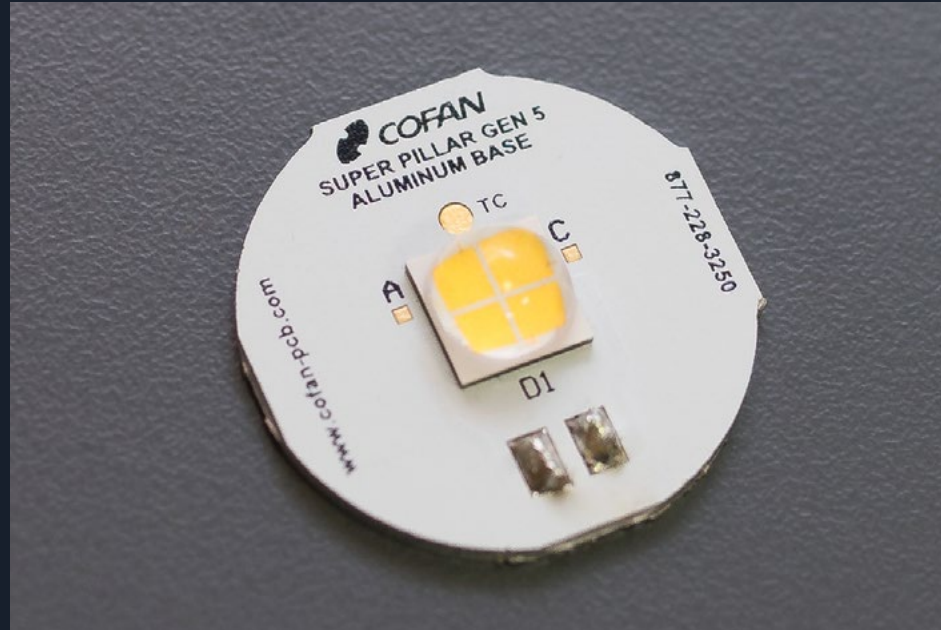


COFANTHERMAL

Trusted Thermal Management Partner Since 1994

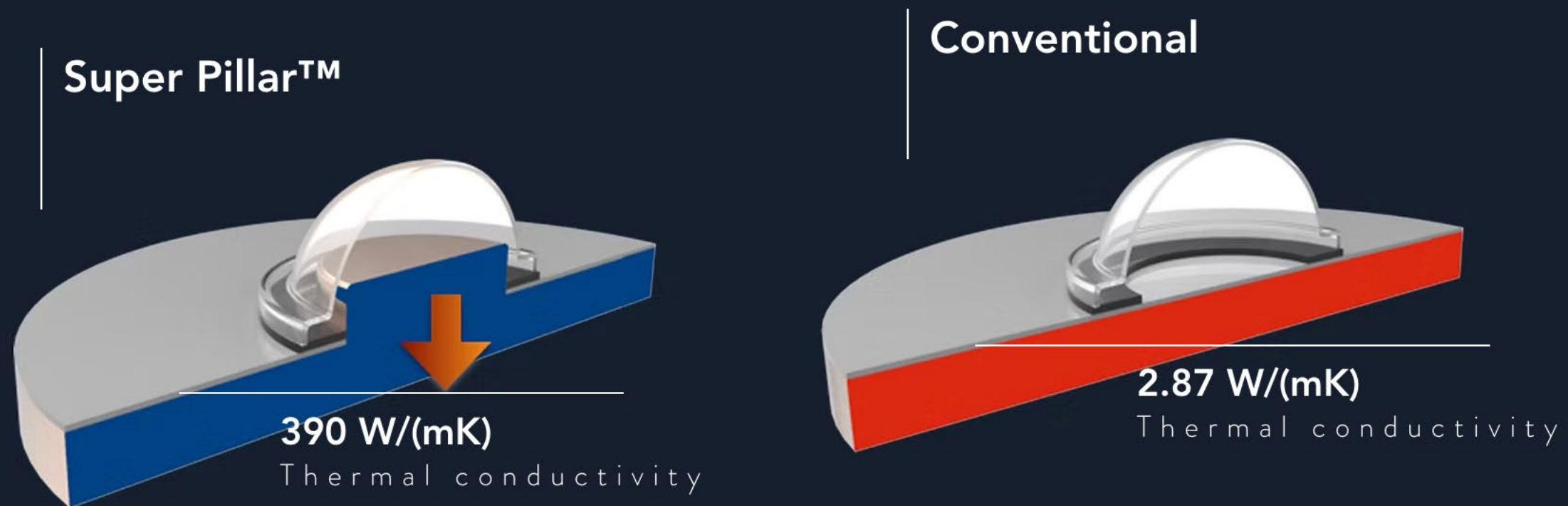
SUPER PILLAR™ TECHNOLOGY

COFAN USA has developed the newly patented Super Pillar™ technology which enables designers to bypass the dielectric pre-preg and dissipate heat more effectively than a conventional MCPCB. The Super Pillar™ bypasses the insulating pre-preg and adds direct metal on the t-pad to the metal on top of the pillar for a direct thermal path, a design proven to conduct more than 100x more heat than a conventional MCPCB.



SUPER PILLAR™ TECHNOLOGY

In LEDs, this means a higher light output per watt, higher reliability, longer product life, and increased cost efficiency. Using the Super Pillar™ technology, COFAN has helped engineers overcome complex thermal management solutions, like UVC lighting. Our Super Pillar™ can be customized with either copper or aluminum; copper offers the best thermal dissipation but it is more expensive, while aluminum is cost-effective and still offers better thermal dissipation than conventional MCPCBs.



SUPER PILLAR™ TECHNOLOGY



SUPER PILLAR™ TECHNOLOGY

Advantages

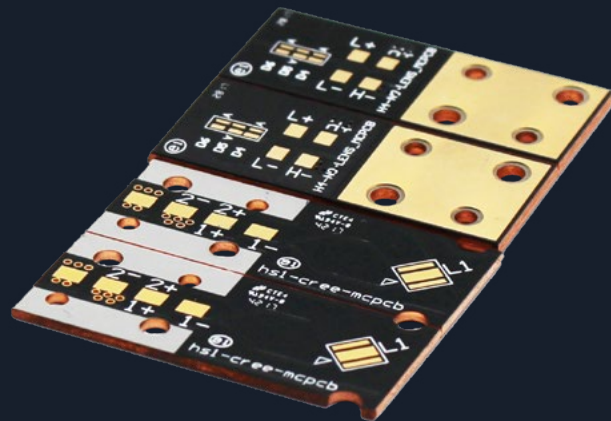
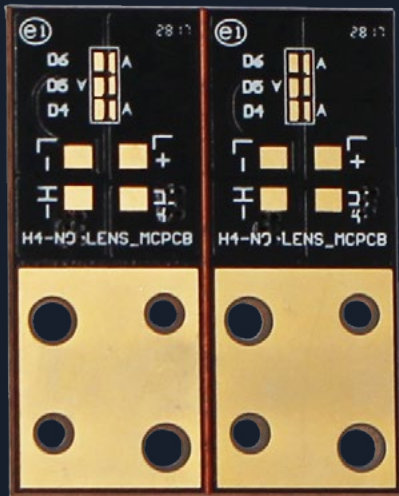
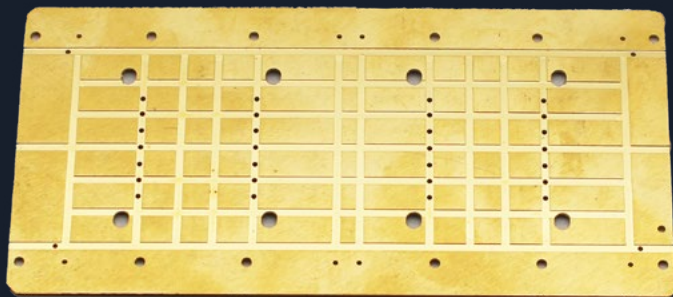
- Increases efficiency
- Components that withstand high power output/LEDs/UVC
- Drives higher current
- Utilizes lower-cost pre-preg



Innovative Process

- Mechanical shaping
- Flexible lamination scale
- Roll-to-roll manufacturing
- Stable production process

SUPER PILLAR™ TECHNOLOGY



HDI VIAS

Title	Standard	Layer1 k = 390	Layer2 k = 1.7	Layer3 k = 390	Layer4 k = 1.7	Layer5 k = 390
Super Pillar	1.40" x 0.049"	1 oz 35 micron Cu Foil	6 mil Sekisui KNDJ002	1 oz 35 micron Cu Foil	1 oz 35 micron Cu Foil	3 mil Sekisui KNDJ002
Conventional	1.40" x 0.049"	1 oz 35 micron Cu Foil	6 mil Sekisui KNDJ002	1 oz 35 micron Cu Foil	3 mil Sekisui KNDJ002	3 mil Sekisui KNDJ002

As you can see from our test results, the Super Pillar™ MCPCB has an extremely low thermal resistance and effective thermal path when compared to a conventional MCPCB with the same power input. There is a significant temperature difference of ~56°C within 80 seconds. The Super Pillar™ decreases the junction temperature drastically. Capture interval: 3-4 seconds. Time elapsed: ~ 80 Seconds.

SUPER PILLAR™ TECHNOLOGY

Test Results				
Item	Unit	Conventional MCPCB	Super Pillar	New Field
T board	°C	45.26	49.81	93.96
R slug - bottom	°C/W	1.35	0.11	0.095
Model Name	P/N	MCPCB with LZP (4x6) Emitter	MCPCB with LZP (4x6) Emitter	MCPCB with LZP (4x6) Emitter
T bottom	°C	46.98	53.57	102.23
Tslug	°C	64.70	55.10	107.28
Ta	°C	25.37	25.38	25.74
Input Pwer	W	13.12	13.73	53.2
Input Voltage	V	16.4	17.6	19.0
LED Current	mA	800	780	2800
R slug - board	°C/W	1.48	0.39	0.25

Conclusion

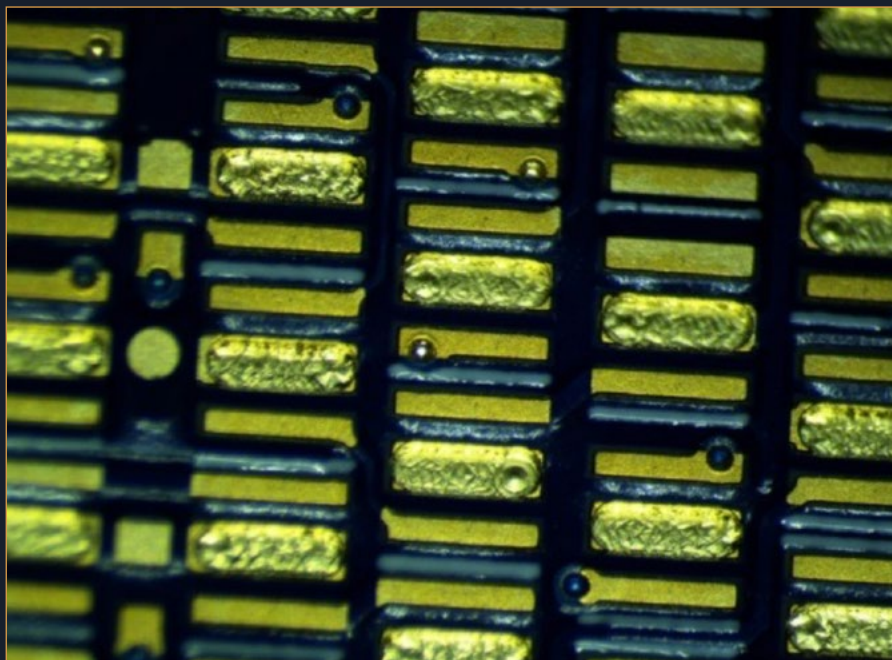
Super Pillar MCPCB provides a direct thermal conductive path for high-power LEDs by bypassing the pre-preg layer. As a result, the optical efficiency increases while thermal decay decreases. This allows users to drive components at higher currents while still conserving energy. Super Pillar technology dramatically improves thermal conduction and decreases the junction temperature drastically.

SUPER PILLAR™ CASE STUDY

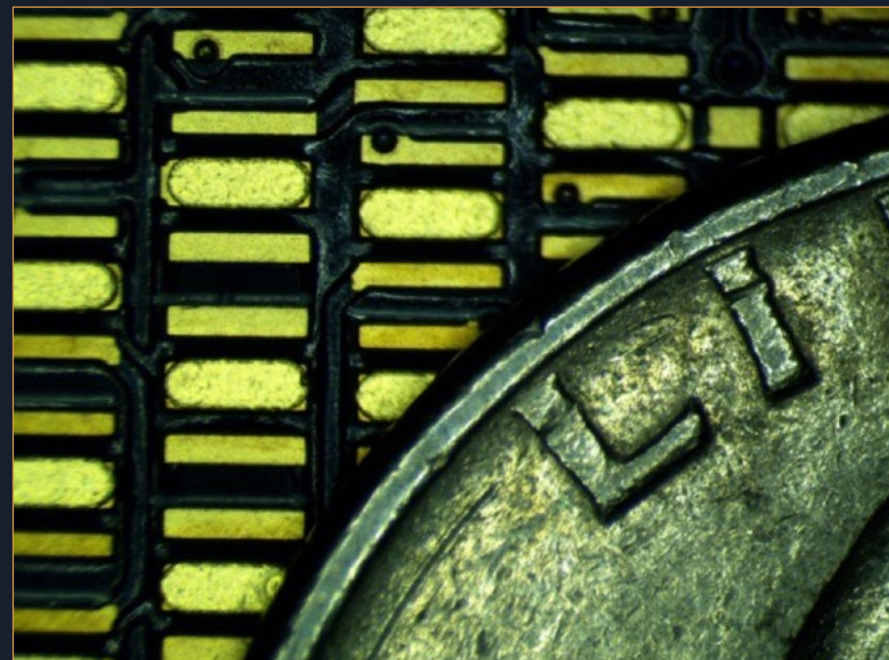
When COFAN's customers want the best in thermal management for PCBs, we recommend our patented Super Pillar™ technology. We don't expect you to trust us on faith alone so we've partnered up with a customer of ours to do thermal tests (with a FLIR camera), pitting our Super Pillar™ against our competitor's aluminum and copper MCPCBs with real, hard numbers.

Thermal Performance Test

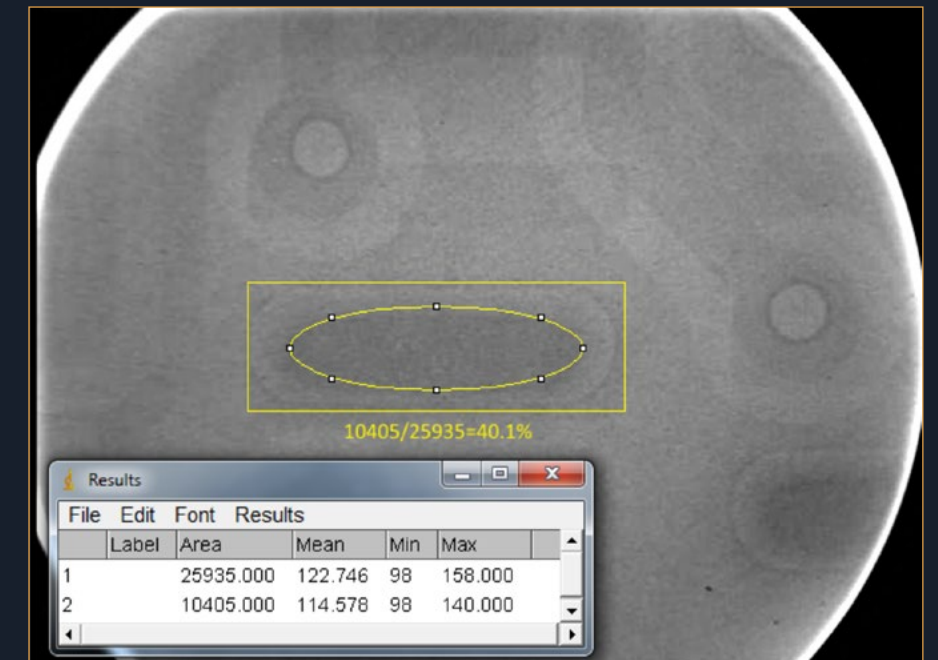
- 3 array constructions tested
 - Super Pillar, copper substrate (COFAN)
 - MCPCB, aluminum substrate (competitor)
 - MCPCB, copper substrate (competitor)
- Target $T_{jmax}=85^{\circ}\text{C}$
 - LED regulation to be enabled at $T_{jmax}=90^{\circ}\text{C}$, intensity throttled



Competitor's MCPCB

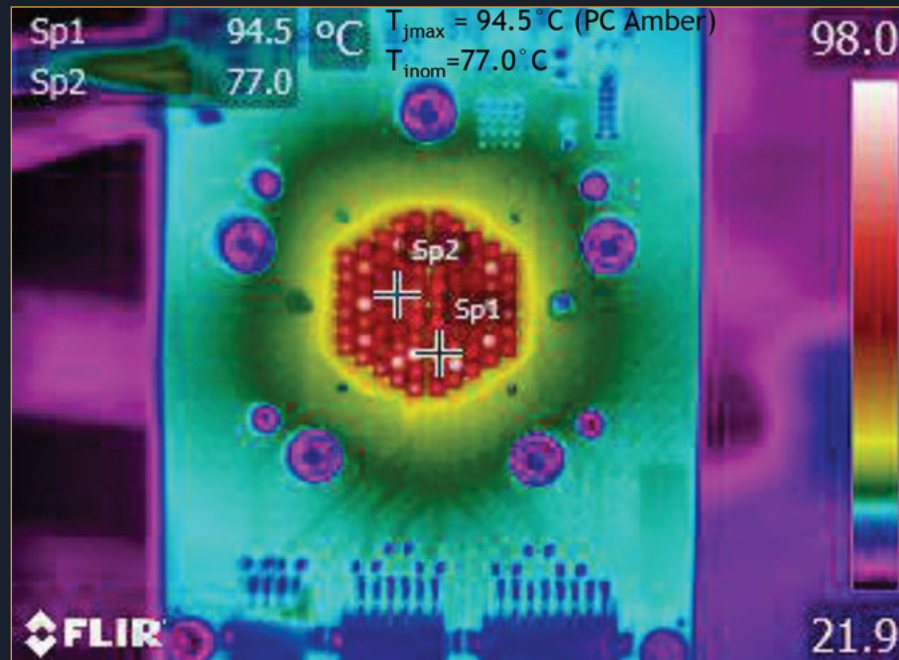


COFAN Super Pillar technology



X-ray of the Super Pillar

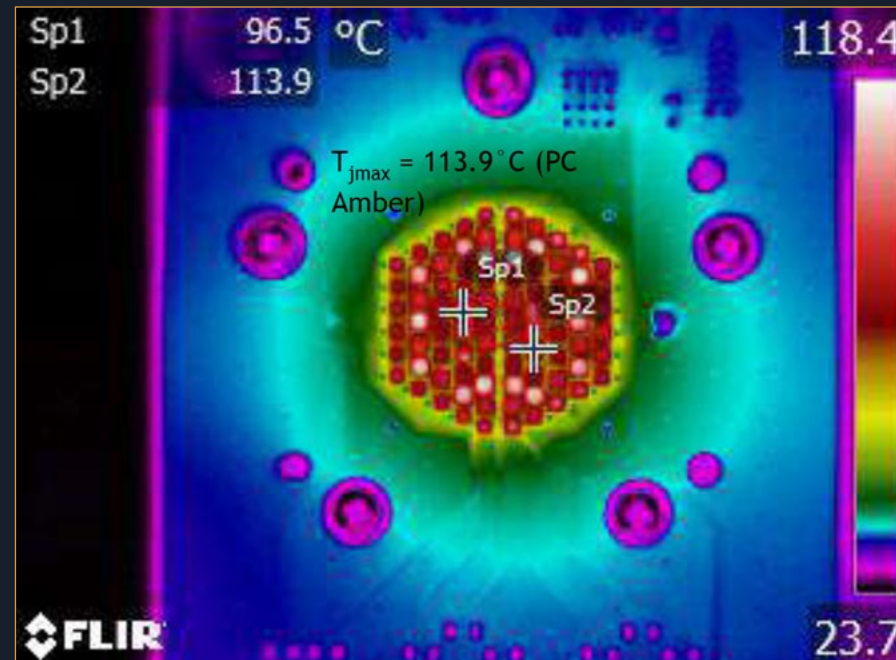
SUPER PILLAR™ CASE STUDY



Cofan's Super Pillar Thermal Temperatures

Cofan's 2 Layer Copper Super Pillar

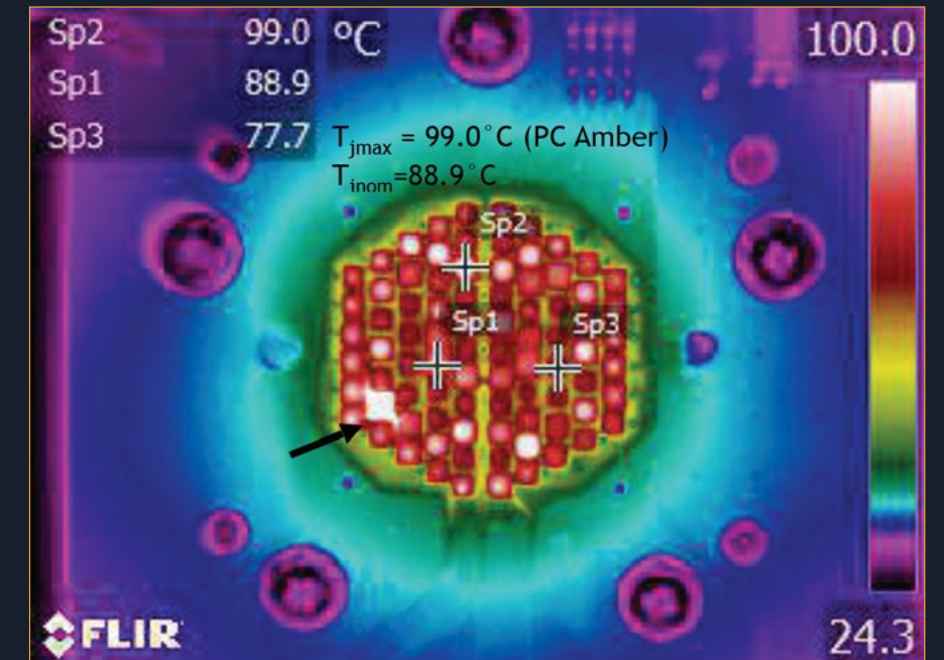
- **Spot 1 temperature: 94.5°C (T_{jmax})**
- **Spot 2 temperature: 77.0°C**
- Sekisui KNDJ002 3mil
- Breck Heatsink
- 2500B5601-COFAN-1A SN 03
- 1050mA / 1225mA (Lime)
- $t=30s$
- Sunon PMD2412PMB1-A(2).GN at 12V



Competitor Aluminum Thermal Temperatures

Competitor's 2 Layer Aluminum

- **Spot 1 temperature: 96.5°C**
- **Spot 2 temperature: 113.9°C (T_{jmax})**
- Breck heatsink
- 2500B5601-1A SN 05
- 1050mA / 1225mA (Lime)
- $t=30s$
- Sunon PMD2412PMB1-A(2).GN at 12V



Competitor Copper Thermal Temperatures

Competitor's 2 Layer Copper

- **Spot 1 temperature: 88.9°C**
- **Spot 2 temperature: 99.0°C (T_{jmax})**
- Breck Heatsink
- 2500B5601-1A SN 05
- 1050mA / 1225mA (Lime)
- $t=30s$
- Sunon PMD2412PMB1-A(2).GN at 12V

SUPER PILLAR APPLICATIONS

Automotive

- EV Cooling: Enhances heat dissipation for batteries, inverters, and motors.
- They offer high thermal conductivity in a space-saving form, ideal for cooling ADAS processors, LED headlights, and electric motors.



Theatre Lighting

- Heat Dissipation: Super Pillars efficiently cool high-power LED fixtures, preventing overheating and ensuring consistent light output.
- Compact Design: Enables slim, lightweight lighting units for better flexibility in stage setups.



Medical

- Medical Device Cooling: Super Pillars dissipate heat in imaging equipment, laser systems, and diagnostic devices, ensuring accuracy and reliability.
- Sleek Design: Enhances portable medical devices with efficient thermal management.



SUPER PILLAR APPLICATIONS

Military

- Device Cooling: Super Pillars manage heat in medical lasers, imaging systems, and diagnostic tools.
- Compact Design: Ensures efficient cooling for portable and high-precision medical equipment.



UV Lighting

- Heat Management: Super Pillars dissipate heat from high-intensity UV lamps, ensuring stable performance.
- Compact Design: Supports slim, efficient UV lighting systems for sterilization and curing applications.



Street Lighting

- Heat Dissipation: Super Pillars cool high-power LED streetlights, boosting efficiency and lifespan.
- Compact Design: Enables sleek, durable lighting solutions for urban and highway use.



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



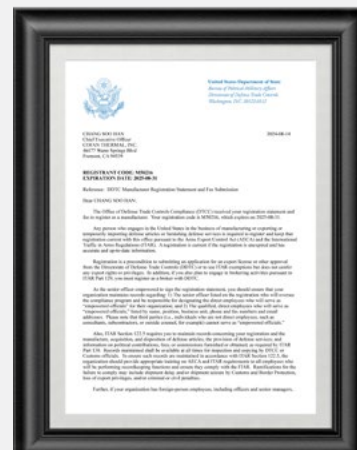
ISO 45001:2020
COFAN Dongguan



IATF 16949:2016
COFAN Taiwan



ITAR
COFAN USA

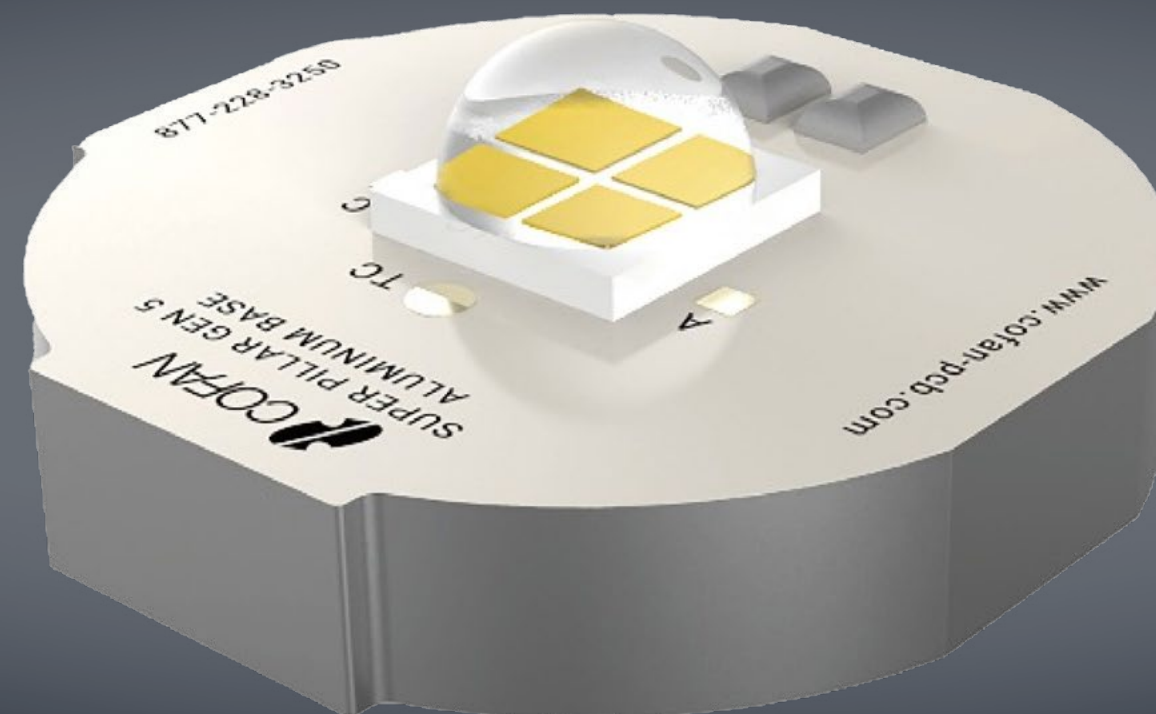


Reach-SVCH
Statement



RoHS-Compliance Certificate
Cofan Taiwan





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