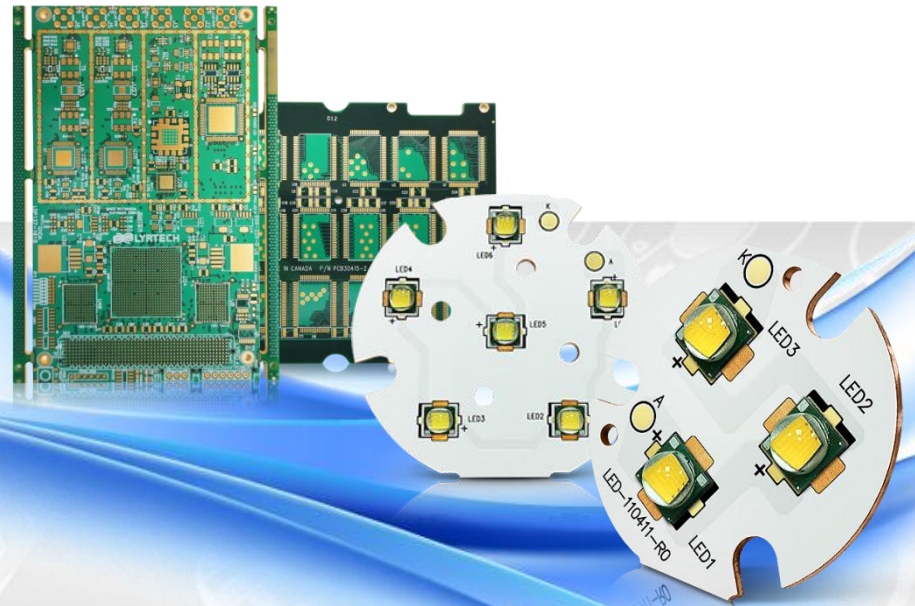




COFAN GROUP

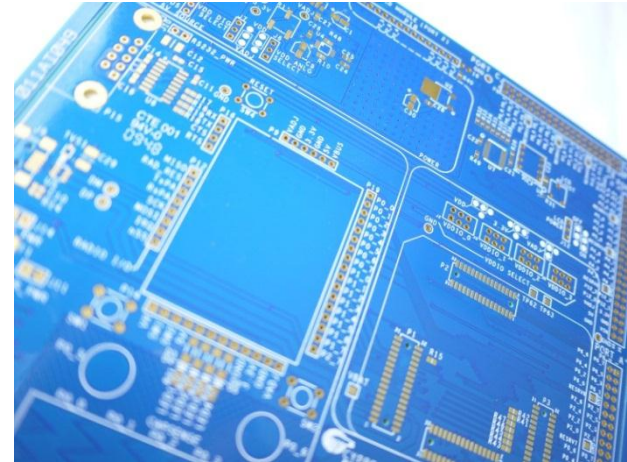
Your MCPCB and PCB supplier.

CofanUSA
46177 Warm Springs Blvd. Fremont CA 94539
1-877-228-3250 | www.cofan-usa.com
CofanCanada
2900 Langstaff Rd. #18 Vaughan, ON. L4K 4R9 Canada
1-877-228-3250 | www.cofan-pcb.com



Contents

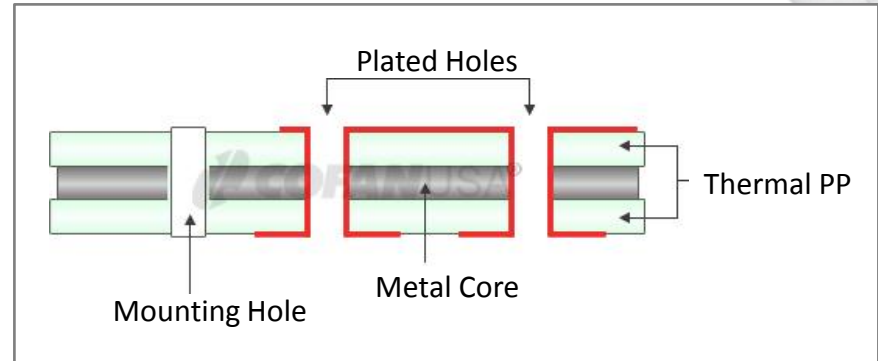
1. Metal Core PCB
2. Design Concepts – Single Sided
3. Design Concepts – Double Sided
4. Design Concepts – Multi layer
5. Design Concepts - Drilled & filled Electrical Vias
6. FR4 - General Capabilities
7. FR4 - Specific Capabilities
8. PCB Prepreg
9. Introduction Sekisui KNDJ
10. Features of the KNDJ Series
11. Sekisui KNDJ Specifications
12. Concurrent Engineering
13. Quality Assurance & Quality Control
14. Why partner with Cofan-USA?



Metal Core PCB

Application:

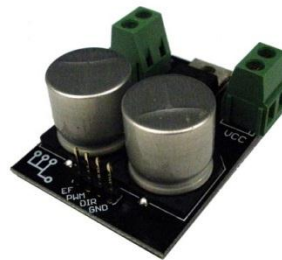
- DC-DC Converter
- Motor control
- High Power LED
- High Current Carrying Capacity
- Conductors (250 Amps or more)



LED



Motor Control



High Power LED



DC-DC Converter



Metal Core PCB

Material Selection:

- T-lam (Laird)
- Sekisui
- Custom (By Cofan Taiwan)
- Bergquist
- Denka
- Arlon

Typical Construction:

- Single Sided
- Double Sided
- Multilayer
- Drilled and Filled (Double Density SMT)

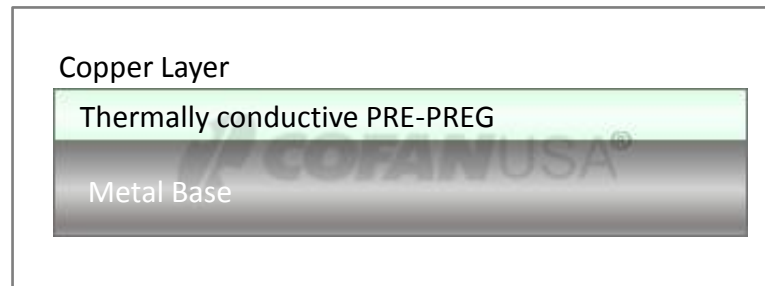
The logo for Sekisui, featuring the word "SEKISUI" in a bold, blue, sans-serif font with a red dot above the letter "K".The logo for The Bergquist Company, featuring the words "THE BERGQUIST COMPANY" in a black, sans-serif font inside a blue-bordered rectangular box with rounded corners.The logo for Arlon, featuring the word "ARLON" in a bold, red, sans-serif font.The logo for Laird Technologies, featuring the word "Laird" in a bold, black, sans-serif font above the word "TECHNOLOGIES" in a smaller, black, sans-serif font, with a blue swoosh underline.The logo for Denka, featuring the word "DENKA" in a bold, blue, sans-serif font.

Metal Core PCB

Capacities:

- Single sided / Double sided / Multi layer
- Copper 1 oz to 8 oz
- Thermal Modeling
- PSR-LEW1 white solder mask from Japan for LED
- RoHS Compliance
- Surface Finish: OSP, IMM Au, Imm Ag, Sn100C, Hasl
- Prototype: 3 days – 5days / Production: 2-5 Weeks

Design Concepts – Single Sided



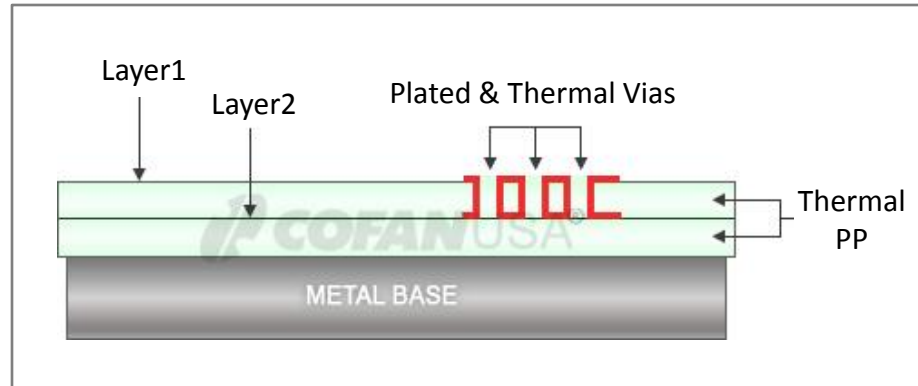
Type: Single Sided

- Single Sided with Metal Base
- Wide Selection of Thermally Conductive PP
- Fully Automation Production Line to Provide Competitive Pricing

Application

- Street lighting
- Mass Production at Low cost.
- LED Light Engines.
- General Lighting

Design Concepts – Double Sided



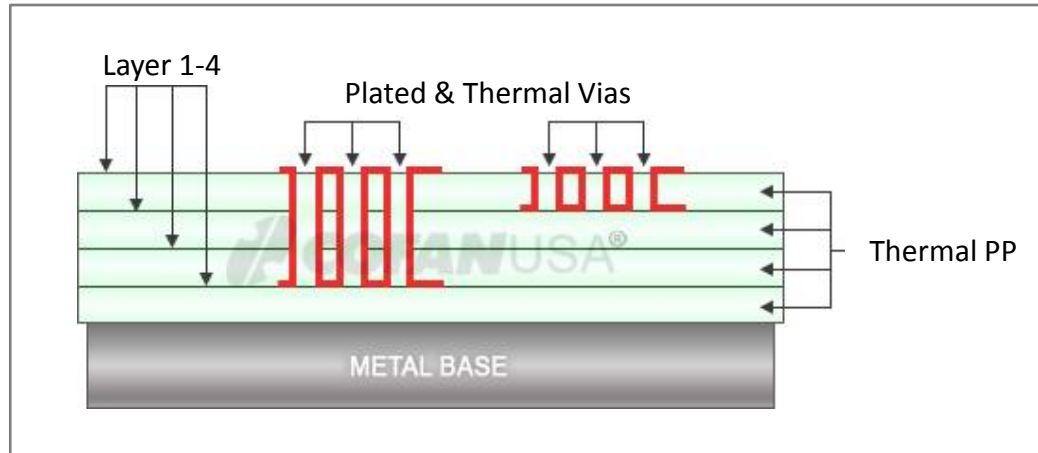
Type: Double Sided

- Single side SMT with Metal Base
- Surface Mounting on Top Layer, All Connectivities Are Being Done On Layer 2
- More Room, More BOM, More Functions.

Application

- Street lighting, General Lighting
- LED Light Engines, Power Conversion.
- Motor Control
- Restriction on PCB Dimension

Design Concepts – Multi layer



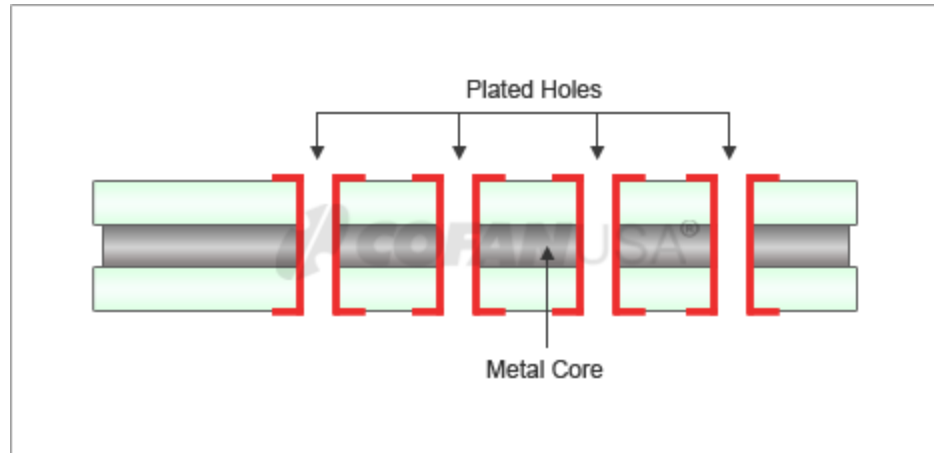
Type: Multilayer

- Single side SMT with Metal Base.
- Surface Mounting on Top Layer,
All Connectivities Are Being Done
On Layer 2 & 3. EMI on Layer 4
- Thermal Vias, Electrical Vias,
- Chasis Vias

Application

- Extreme Power Conversion.
- Military Application.
- Extreme LED Engines.
- Light Weight Power Supply for
Aircraft.

Design Concepts - Drilled & filled Electrical Vias



Type: Drilled & filled Electrical Vias

- Double sided surface mounting.
- Metal core isolated from all electrical vias.
- Chasis Vias and thermal interface to heat sink can be established through exposed metal areas.

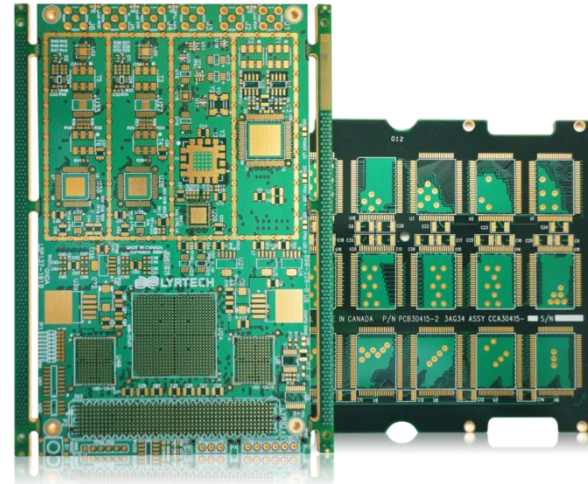
Application

- Restricted pcb dimension.
- Retrofit applications
- LED Light Engines.
- Utilized SMT on both sides.

FR4 - General Capabilities

General Capabilities

- a) Single Sided
- b) Double Sided
- c) Multi Layer
- d) Burried Via
- e) Blind Via
- f) Impedance Controlled
- g) Micro Via
- h) Laser Drilling
- i) RoHS Compliance
- j) Epoxy filled vias



FR4 - Specific Capabilities

Attribute: see (*) below as applies	S/Sided	D/Sided	Multilayer	Advanced
Minimum Line/Spacing, Internal Layer	N/A	N/A	.004"/.004"	.003"/.003"
Minimum Line/Spacing, External Layer	.007"/.008"	.007"/.008"	.005"/.005"	.003"/.003"
Aspect Ratio (Thickness to Drill)	6:1	6:1	8:1	10:1
Minimum Drilled Hole Size	.010"	.008"	.008"	.008"
Land Size Internal (Diameter Over Drill)	N/A	N/A	.015"	.012"
Land size External (Diameter Over Drill)	.012"	.012"	.012"	.010"
Plane Clearance (Diameter Over Drill)	.030"	.030"	.030"	.024"
Plated Hole Tolerance	+/- .003"	+/- .003"	+/- .003"	+/- .002"
Minimum Dielectric Thickness	N/A	N/A	.0025"	.002"
Minimum Core Thickness	N/A	N/A	.004"	.003"

FR4 - Specific Capabilities

Attribute: see (*) below as applies	S/Sided	D/Sided	Multilayer	Advanced
Minimum PCB Thickness **	.017"	.018"	.020"	.020"
Maximum PCB Thickness	.125"	.125"	.250"	.250"
Thickness Tolerance (%)	+/- 10	+/- 10	+/- 10	+/- 5
Maximum Board Dimensions *	16" x 52" *	19" x 22" *	17" x 23" *	17" x 23" *
Fabrication Tolerances (overall dimension)	+/- .010"	+/- .010"	+/- .010"	+/- .005"
Bow and Twist (Through Hole) %	1.5	1.5	1.5	1
Bow and Twist (SMT) %	.75	.75	.75	.75
Minimum Conductor to Edge	.015"	.015"	.015"	.010"
Layer to Layer Registration Tolerance	N/A	.004"	.004"	.003"
Component Pitch	.025"	.025"	.025"	.015"

FR4 - Specific Capabilities

Attribute: see (*) below as applies	S/Sided	D/Sided	Multilayer	Advanced
Soldermask Clearance	005"	005"	005"	004"
Soldermask Dams	005"	005"	005"	004"
Impedance Tolerance (>50 Ohms) %	+/- 10	+/- 10	+/- 10	+/- 8
Maximum Layers	1	2	12	16
Minimum Copper Weight Inners (oz.)	N/A	N/A		1/4
Maximum Copper Weight Int. Ground (oz.)	N/A	N/A	3	8
Maximum Copper Weight Int. Signal (oz.)	N/A	N/A	2	6
Maximum Copper Weight Ext. Ground (oz.)	4	4	2	10
Maximum Copper Weight Ext. Signal (oz.)	4	4	3	10

MCPCB Prepreg

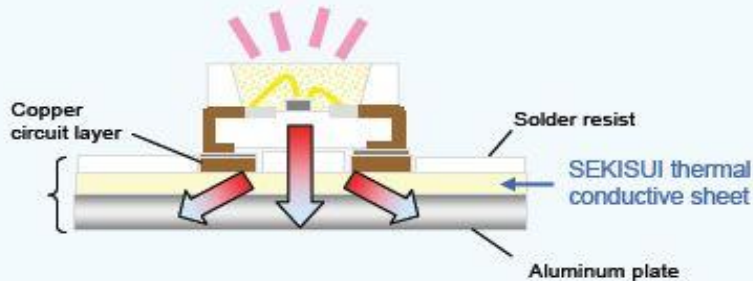


The world's leader in LED materials including Thermally Conductive PCB Substrate (KNDJ), Encapsulating Material (SLS), and High Reliability photo resist (SCR).

Having been in the material business since 1947, this Japan based company has grown in size and capability and is one of the worlds leaders in the PCB Prepreg field, amongst many other frontiers in the modern day and age.

Introduction Sekisui KNDJ

SEKISUI thermal conductive sheet makes LED “ Brighter ” & “ Longer life ”



Because of ...

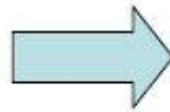
*Decrease LED chip temperature
with it's excellent heat-release property*

Advantage of KNDJ series

- KNDJ series can provide **reasonable CCL & prepreg** because of high productivity.
- KNDJ series can **reduce CCL manufacturing costs** because of excellent handling ability.
- KNDJ series shows **excellent insulating properties and quality stability**.

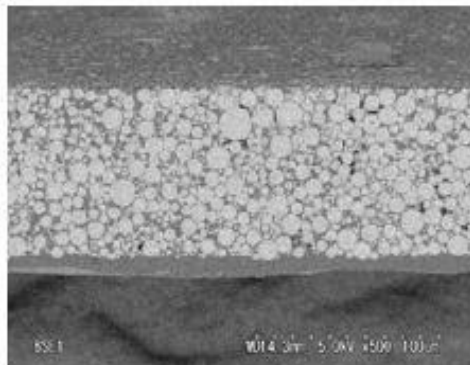
Features of the KNDJ Series

Unique resin/filler design



Good handling before curing without glass fabric (SEKISUI only)

1) KNDJ series can be controlled the volume of thermal conductive filler (~90wt%)



2) Thinner insulation layer is possible (~30μm)

※thermal resistivity is proportional to thickness

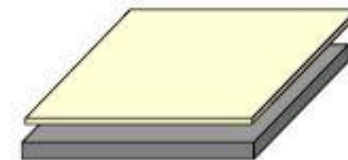
$$R = h / A \cdot \lambda$$

(R : thermal resistivity
h : thickness
A : contact area
λ : thermal conductivity)

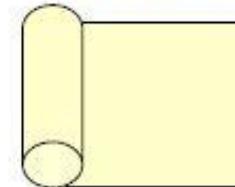


Glass fabric disturb heat diffusion and film thickness reducing

3) Easy handling @ ply-up



Large area press possible



Roll to roll press possible

Sekisui KNDJ Specifications

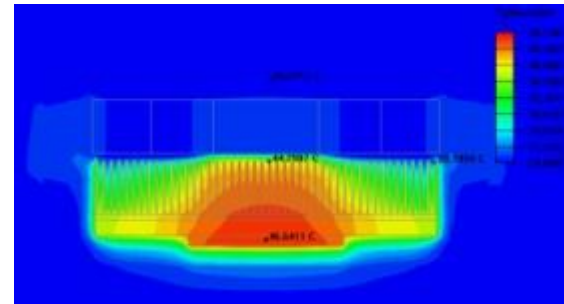
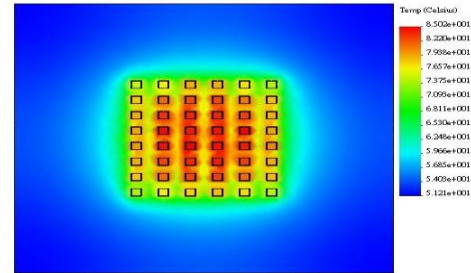
Properties	KNDJ003	KNDJ002	KNDJ001	remarks
Thickness	50~300 μm	50~300 μm	80~300 μm	IPC 4101
Thermal conductivity	1.0 W/m·K	2.3 W/m·K	2.8 W/m·K	ASTM E1461
Tg	136°C	125°C	122°C	DMA
CTE(<Tg/ >Tg)	41ppm/127ppm	34ppm/123ppm	11ppm/29ppm	TMA
E' (-50°C)	11,000 MPa	19,000 MPa	26,000 MPa	DMA
E' (25°C)	6,800 MPa	15,000 MPa	21,000 MPa	
E' (120°C)	1,800 MPa	1,100 MPa	1,900 MPa	
Young's modulus	3.8 GPa	5.1 GPa	18.0 GPa	Tensile test
Water absorption rate	< 0.5%	< 0.5%	< 0.5%	121°C/2.1atm/100RH% 2h
Breakdown voltage (AC)	> 6 kV/mm	> 6kV/mm	> 4 kV/mm	ASTM D149 (Test condition A)
Surface resistivity	1.5E+17 $\Omega / \text{—}$	5.6E+17 $\Omega /$ 3.3E+17 Ω	1.9E+17 $\Omega /$ 2.7E+17 Ω	JIS K6911 (Test condition A / 35°C 90RH% 96 h)
Volume resistivity	4.5E+18 $\Omega \cdot \text{cm} / \text{—}$	8.7E+18 $\Omega \cdot \text{cm} /$ 4.3E+18 $\Omega \cdot \text{cm}$	6.0E+18 $\Omega \cdot \text{cm} /$ 1.9E+18 $\Omega \cdot \text{cm}$	
Cu peel strength (1oz)	1.5 kgf/cm	1.5kgf/cm	1.6 kgf/cm	JIS C6481(Test condition A)
	1.5 kgf/cm	1.5kgf/cm	1.7 kgf/cm	JIS C6481(@ 120°C)
	1.4 kgf/cm	1.5kgf/cm	1.5 kgf/cm	Heat treatment (260°C 2min)
	1.4 kgf/cm	1.5 kgf/cm	1.5 kgf/cm	Heat treatment (288°C 2min)
Dielectric constant (1MHz)	4.5~5.5	5.5~6.5	7.5~8.0	Static capacitor method
Dielectric loss tangent (1MHz)	0.022	0.029	0.0112	
Solder float (288°C)	> 20min	> 20min	> 20min	High power hot plate
Solder float (300°C)	> 10min	> 10min	> 10min	

Concurrent Engineering

Design concept

- Gerber file review/DRC
- Material selection
- Construction
- DFM
- Palletize for SMTA
- Thermal Modeling

模型名稱: 21chuhshu_11
模型名稱: 21chuhshu_11
模型名稱: 21chuhshu_11
模型名稱: 21chuhshu_11



Concurrent Engineering(Thermal modeling)

Computer Aided Design

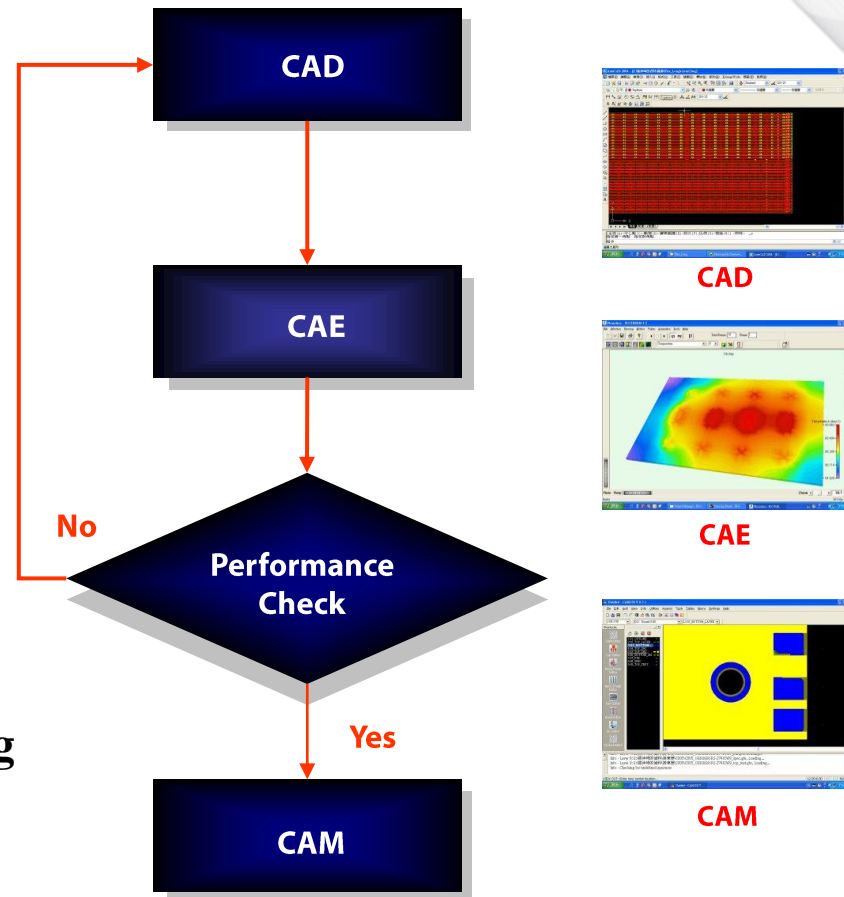
- Autocad
- Pro/E
- Solidwork

Computer Aided Engineering

- Flotherm
- Ice-Pack
- Cosmos

Computer Aided Manufacturing

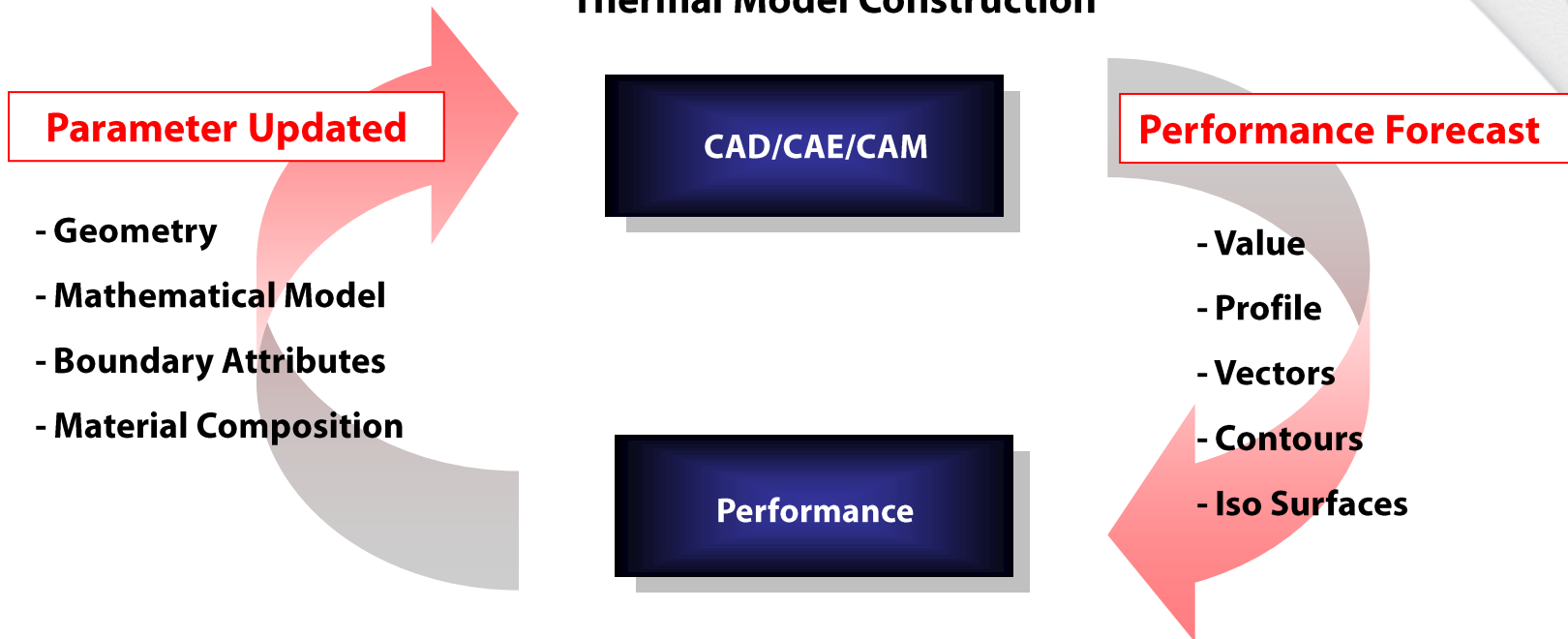
- Master CAM
- CAM 350



Computer Aided Development

Concurrent Engineering

Thermal Model Construction

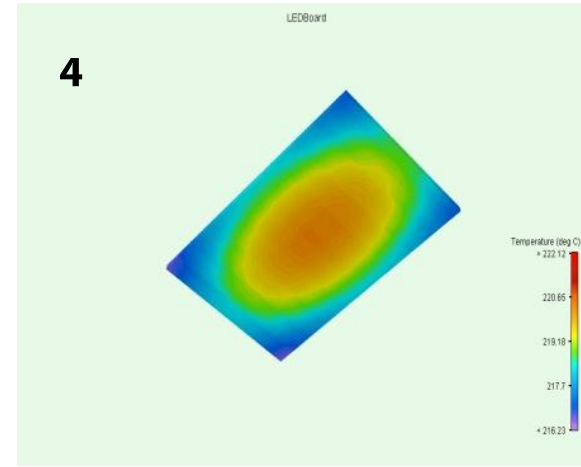
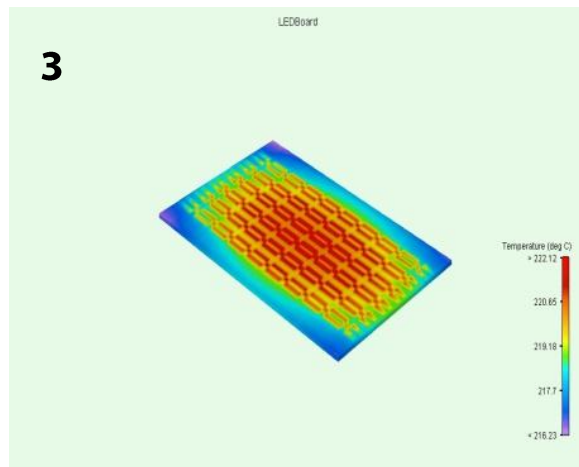
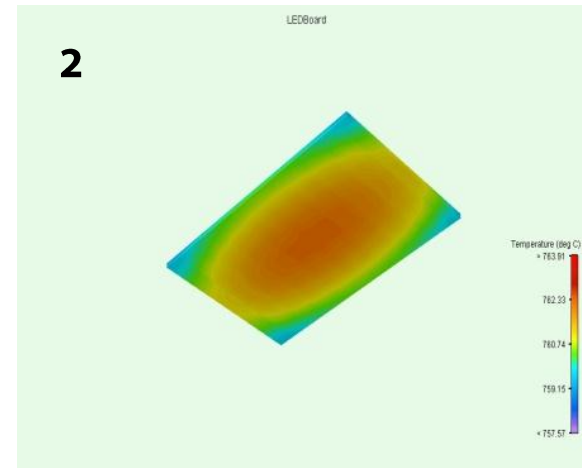
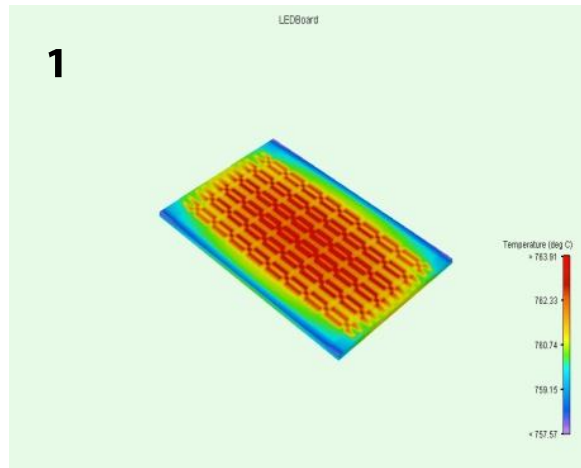


Advantage of Thermal Modeling and Simulation:

- Optimum Design
- Reduce Sample Run
- Failure Prevention
- Reduce Project Developing Time
- Low Cost

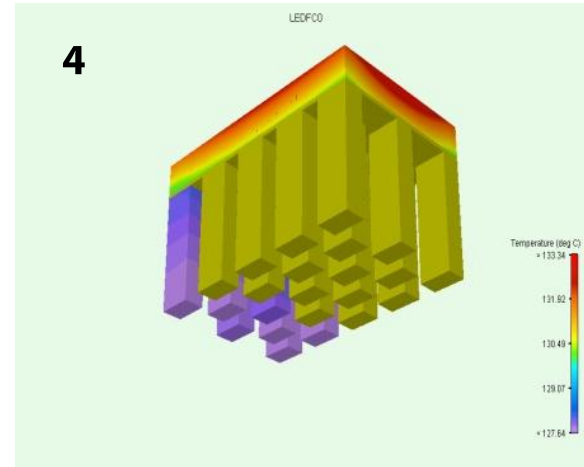
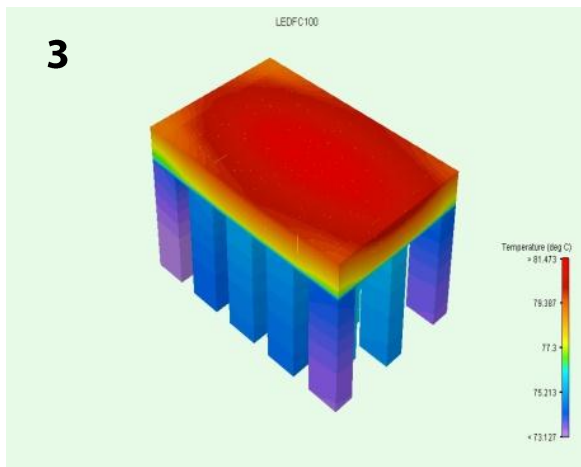
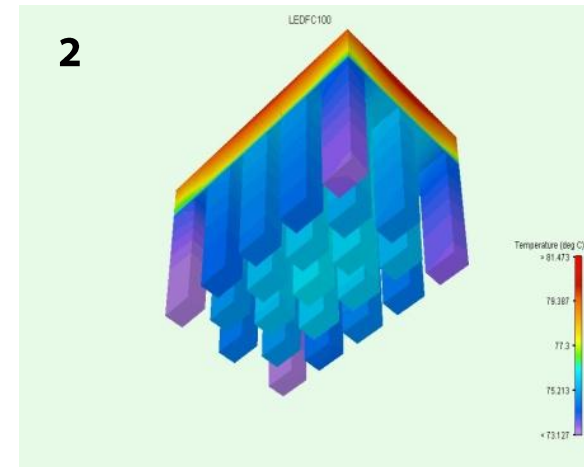
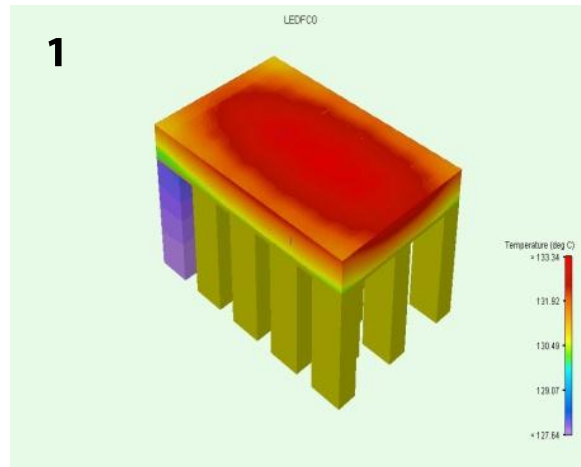
Concurrent Engineering

Thermal Simulation - POST PROCESS WITH FINS



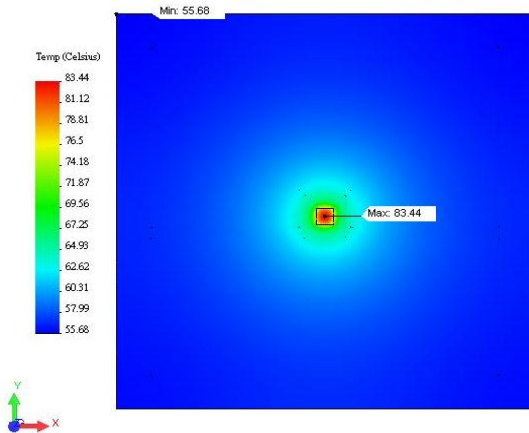
Concurrent Engineering

Thermal Simulation - POST PROCESS WITH FINS

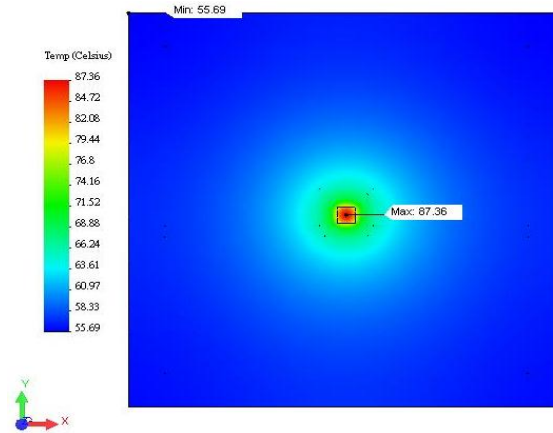


Concurrent Engineering

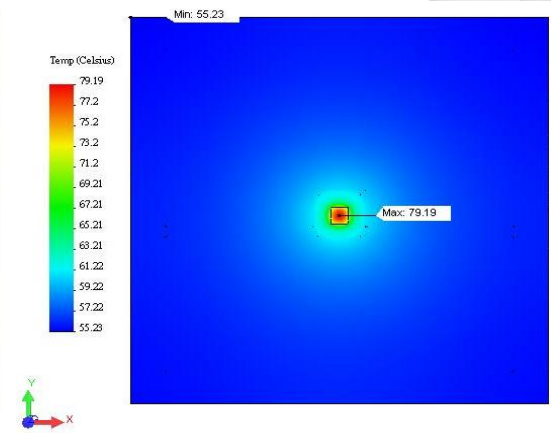
Thermal Simulation



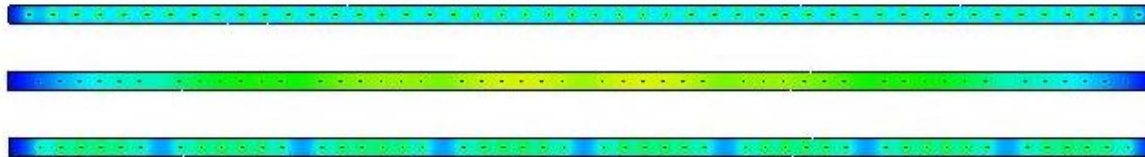
BOARD THICKNESS: 1.5MM
BOARD SIZE: 120 MM X 120 MM
MAXIMUM TEMPERATURE: 87.36 C



BOARD THICKNESS: 2.0 MM
BOARD SIZE: 120 MM X 120 MM
MAXIMUM TEMPERATURE: 83.44 C



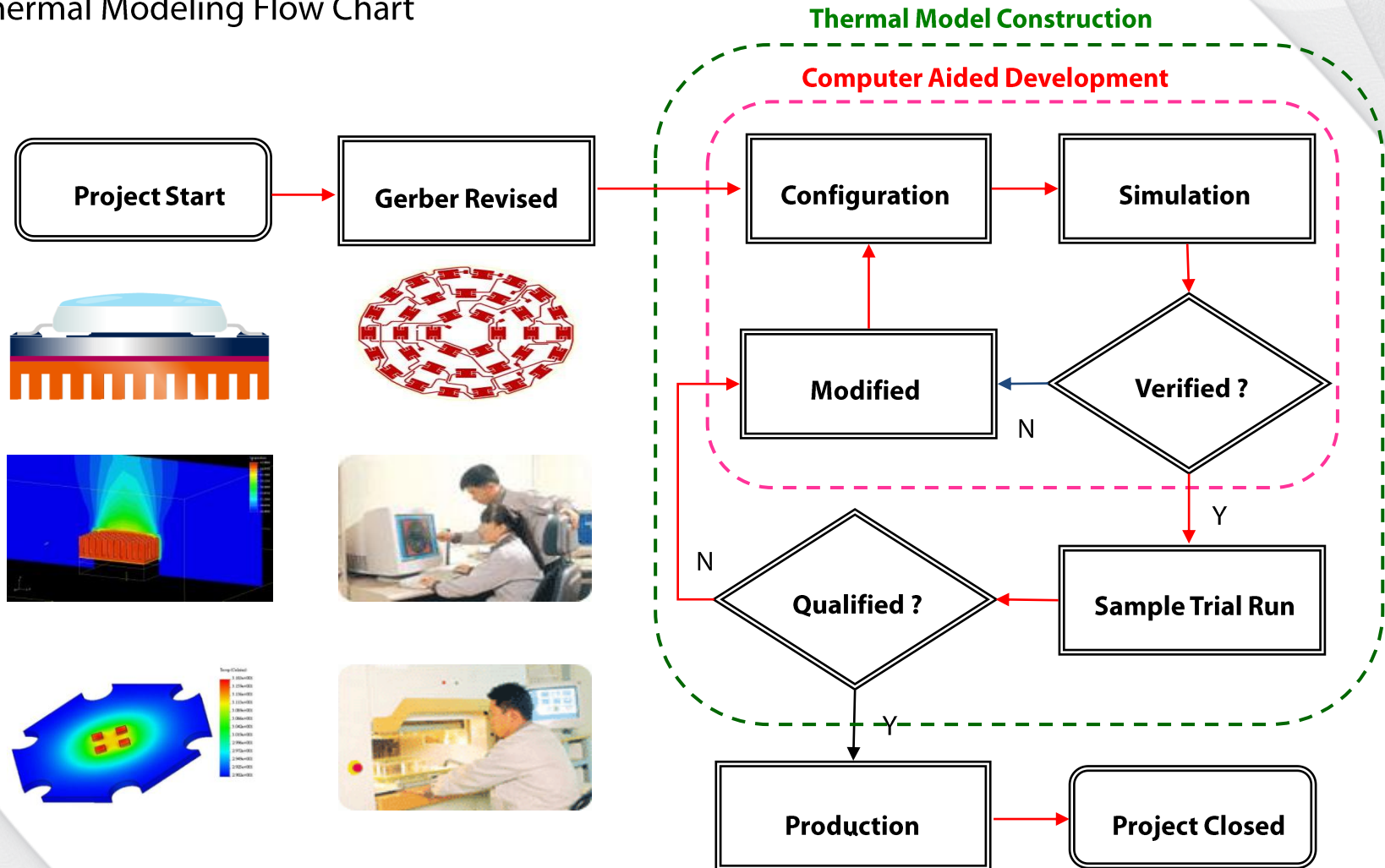
BOARD THICKNESS: 3.0 MM
BOARD SIZE: 120 MM X 120 MM
MAXIMUM TEMPERATURE: 79.19 C



Thermal Distribution : Heat Source vs. Location and material

Concurrent Engineering

Thermal Modeling Flow Chart



Circuit Pattern



Exposure



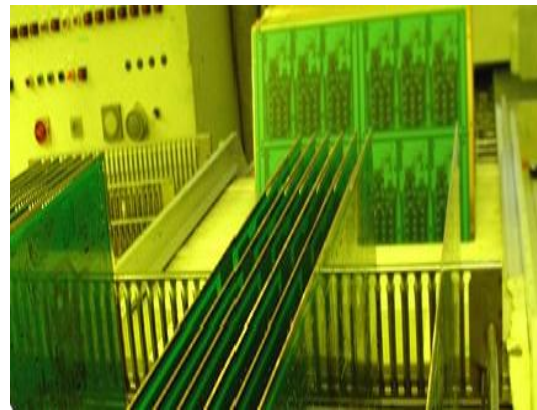
Pre-treatment



AOI



Solder Mask



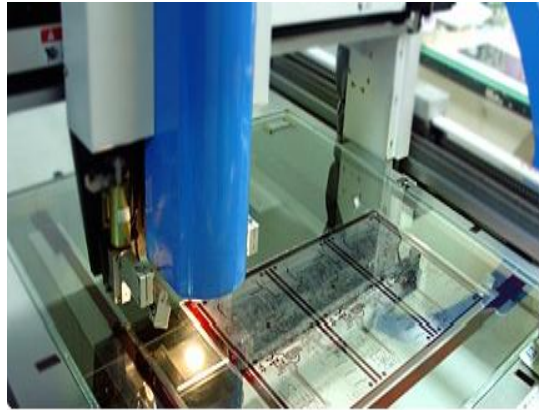
Development



A/W Exposure



A/W 3D measurement



Drilling



Drilling



A/W CCD Drilling



Routing



V-Score



E-Testing



Hole Counter



X-ray



Hole Location Check



Visual Inspection



Quality Assurance & Quality Control

Quality Standards

- ISO 9001:2000
- ISO 9001:2008
- IPC-6011
- IPC-6012B
- ANSI/IPC-A-600
- IPC-4101B
- UL/CSA

ONLINE CERTIFICATIONS DIRECTORY

ZPMW2.E202216
Wiring, Printed - Component

Enhanced searching capability for this category can be found in U.S. & Canada of Database (US&CAN).
E202216

Wiring, Printed - Component

See General Information for Wiring, Printed - Component

COFAN ELECTRONIC CO., LTD.
47 Lane 49 Dong Feng Street
SHULIN DISTRICT, TAIPEI CITY, TAIWAN

Type	Code		Min	Max	Unit	Min	Max	Unit	Min	Max	Unit	Min	Max	Unit	Min	Max	Unit	
	Min	Max																
802	0.1 (0.004)	0.2 (0.008)	17 (0.671)	104 (4.134)	105	76 (2.953)	300 (11.811)	300	60	0.05	0.4	0.05	0.4	0.05	0.4	0.05	0.4	0.05
803	0.1 (0.004)	0.4 (0.016)	17 (0.671)	104 (4.134)	105	76 (2.953)	300 (11.811)	300	60	0.05	0.4	0.05	0.4	0.05	0.4	0.05	0.4	0.05

CTE

and type designation. May be followed by a suffix to denote feature identification.
L&S 03/05/08 or 10/10/10/10

COFAN ELECTRONIC CO., LTD.

Environmentally Certified
Certificate of Registration
Cofan Electronic Co., Ltd.
No. 87, Lane 49, Dong Feng Street, Shulin Dist., New Taipei City, 23856, Taiwan (R.O.C.)

The above licensee has been assessed and registered by TQCSI International Pty Ltd as having the capability to control the environmental systems associated with its operations in accordance with the conditions of the Licence Agreement at or from the address shown above, under an environmental management system complying with the requirements of

ISO 14001:2004

The registration covers the manufacturing of MCPCB and PCB.
Exclusions: 7.3 Design and Development
Issue Date: 24 November 2011
Expiry Date: 24 November 2012

Original Certification: 05 May 2010

Crigit J Bates
President
TQCSI International (Group) Pty Ltd

Lorraine Walsh
Accreditation Manager
TQCSI International (Group) Pty Ltd
for and on behalf of the
TQCSI Certification Approval Panel

This certificate verifies the original certificate issued and is valid as long as it is displayed as an electronic copy of the original certificate and surveillance audits are satisfactorily completed.

TQCSI INTERNATIONAL PTY LTD
AWCB IAF G

DIRECT ASSESSMENT SERVICES

DAS
Quality Management System
Certificate of Approval

This is to certify that the Quality Management System of

Shenzhen Cofan Technology Co., Ltd.

Behind the Dading Repair Factory, Songshan Road, Guanlan, Shenzhen City, Guangdong Province, P.R. China

Has been assessed and found to meet the requirements of

ISO 9001:2008

Manufacturer and Service of Hardware Products and Plastic Products (Cooling Fan, Cooling Fan), LED Lamp, PCB, Connector

Certificate Number: Q141007129
Date of Issue: 16 July 2010
Valid until: 15 July 2013

Authorized by: [Signature] Senior Executive

This Certificate is the Property of DAS
The validity of this registration will be confirmed only when the registrant accepts the stated conditions which shall be available on our website.
Renewance audit

IAF Registered ISO 9001:2008

DAS Certification Ltd, Company Number: 1386213, 10 Ridgeway, Clonsilla, Victoria, Australia. P.O. Box 108, U.S. 10
Address in U.S.: 10000 W. 10th Avenue, Suite 100, Golden, Colorado 80401, U.S.A.
Tel: (800) 721-2277 Ext. 100 Fax: (800) 721-2277 Email: info@das-certification.com

TQCSI
Quality Certified
Certificate of Registration
Cofan Electronic Co., Ltd.
No. 87, Lane 49, Dong Feng Street, Shulin Dist., New Taipei City, 23856, Taiwan (R.O.C.)

The above licensee has been assessed and registered by TQCSI International Pty Ltd as having the capability to control the quality of goods or services provided in accordance with the conditions of the Licence Agreement at or from the address shown above, under a quality management system complying with the requirements of

ISO 9001:2008

The registration covers the manufacturing of MCPCB and PCB.
Exclusions: 7.3 Design and Development
Issue Date: 24 November 2011
Expiry Date: 21 November 2012

Original Certification: 24 November 2009

Crigit J Bates
President
TQCSI International (Group) Pty Ltd

Lorraine Walsh
Accreditation Manager
TQCSI International Pty Ltd
for and on behalf of the
TQCSI Certification Approval Panel

This certificate verifies the original certificate issued and is valid as long as it is displayed as an electronic copy of the original certificate and surveillance audits are satisfactorily completed.

TQCSI INTERNATIONAL PTY LTD
AWCB IAF G

Why partner with Cofan-USA?

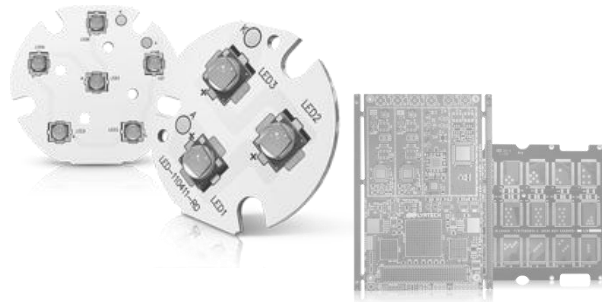
- 1. TECHNOLOGY**
- 2. QUALITY**
- 3. RESPONSIVENESS**
- 4. DELIVERY**
- 5. COST**

Cofan invites you, our prospective customer, to join us as we grow to the next level of success.

Thanks.

COFAN GROUP

Your MCPCB Thermal Management Solution Supplier.



CofanUSA
46177 Warm Springs Blvd. Fremont CA 94539
1-877-228-3250 | www.cofan-usa.com
CofanCanada
2900 Langstaff Rd. #18 Vaughan, ON. L4K 4R9 Canada
1-877-228-3250 | www.cofan-pcb.com