

**Taiyo Kogyo Co., Ltd.**



# HCPCB Technology Guide

**APEC<sup>®</sup>**  
**2024**

Confidential

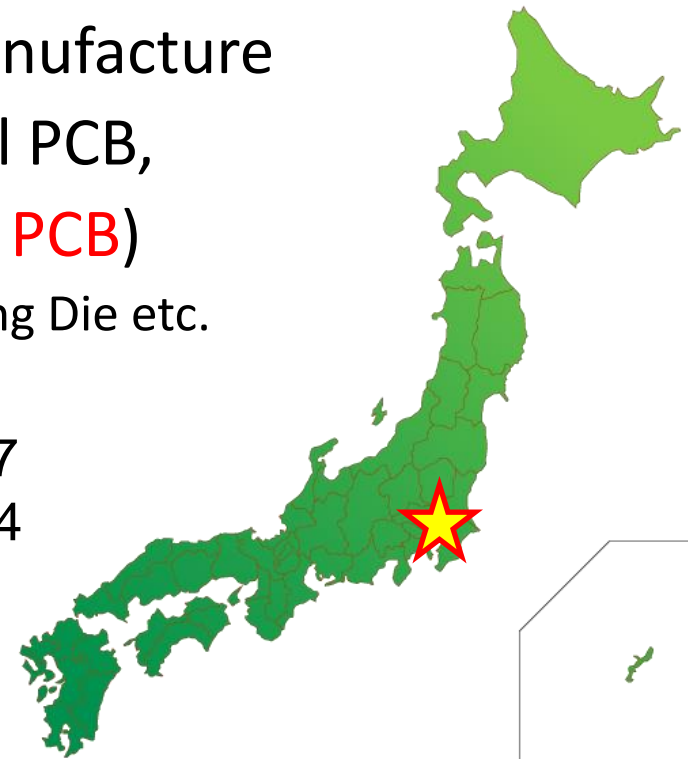


# Company Profile

- Company Name : TAIYO KOGYO CO., LTD.
- Head Office : Tokyo, Japan
- Established : August 15<sup>th</sup>, 1947
- Employees : 355 as of March 31, 2023
- Business field : To design and manufacture  
Printed Circuit Board (Conventional PCB,  
**High Current PCB, Heat Dissipation PCB**)

\*Sheet metal processing / Painting / Punching Die etc.

- ISO-9001 : Date of Acquisition: June, 1997
- ISO-14001 : Date of Acquisition: March, 2004
- UL : E44308 Listed





# Types of PCB

- High Current PCB
- High Heat Dissipation PCB

- Thick Copper PCB
- Ultra Thick Copper PCB
- Combination PCB
- Copper Inlay PCB
- Bus Bar Embedded PCB  
(+Cavity/Terminal Functions)

# Available Specification


	Conventional PCB	High Current & High Heat Dissipation PCB
Copper foil thickness	0.5oz / 1oz / 2oz	3oz / 4oz / 5oz / 6oz / 6.8oz / 8.6oz / 11.4oz / 14.3oz / 22.8oz / 28.5oz / 57.1oz
Number of Layers	2 – 16 layers	2-16 layers / 2 - 6 layers
Board Thickness	0.6mm – 3.5mm	*0.6mm – 1.3mm - 3.5mm
Material	FR-4 / CEM-3	FR-4 / High Tg 170 material
Soldermask (Color)	Green / Blue / White / Black	Green / Blue / White / Black
Surface Finish	OSP / HASL / ENIG	OSP / HASL / ENIG

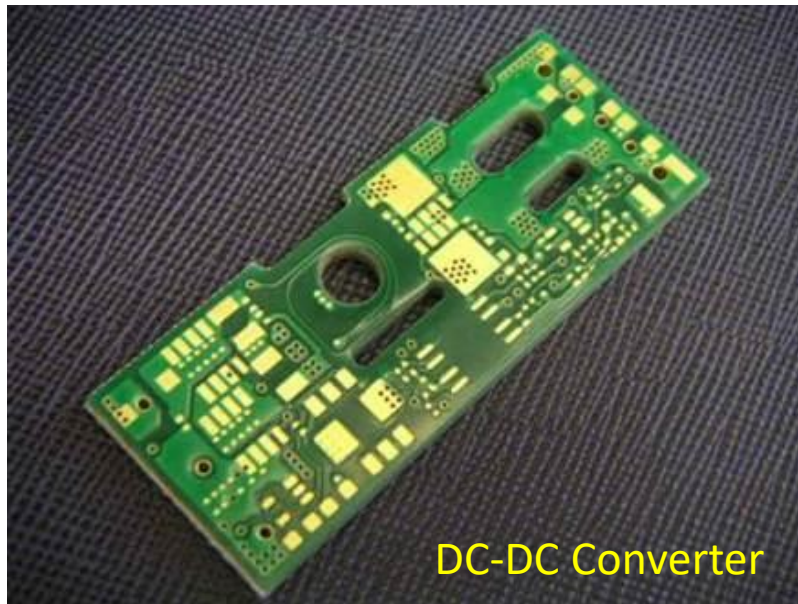


# Thick Copper PCB

High Current

Heat Dissipation

- Copper foil thickness : 3oz / 4oz / 5oz / 6oz / 6.8oz
- Number of Layers : 2-16Layers (\*depending on copper foil thickness)
- Board thickness : 0.023"-0.137" (0.6-3.5 mm)
- Available : IVH / To combine with less than 2oz copper is available.
- UL : Certified 



DC-DC Converter




10Layers IVH  
All layers 3oz  
Board thickness  
0.102" (2.6mm)

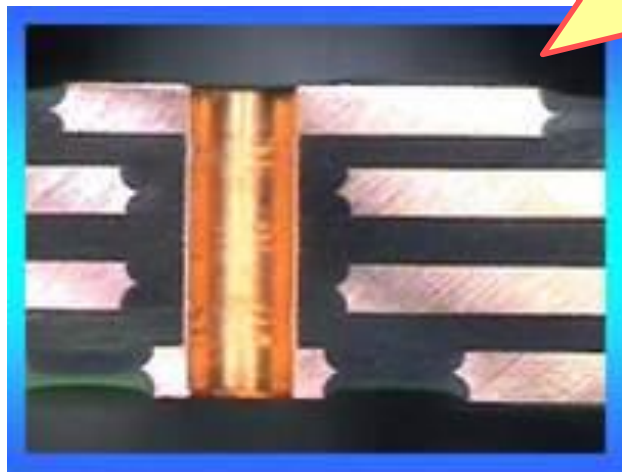
# Ultra Thick Copper PCB

High Current

Heat Dissipation

- Copper foil thickness : 8.6oz / 11.4oz / 14.3oz (using rolled copper foil)
- Number of Layers : 2-6Layers (\*depending on copper foil thickness)
- Board thickness : 0.051"-0.137" (1.3-3.5 mm)
- Available : IVH / To combine with less than 6.8oz copper is available.
- UL : Certified 

All layer 14.3oz  
Board thickness  
0.125" (3.2mm)




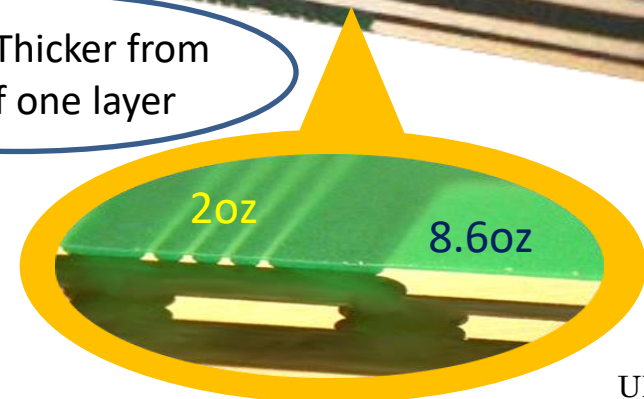
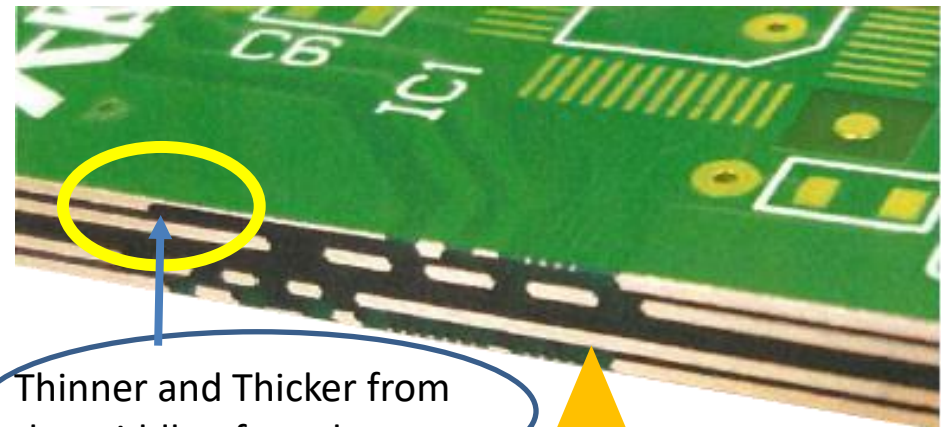
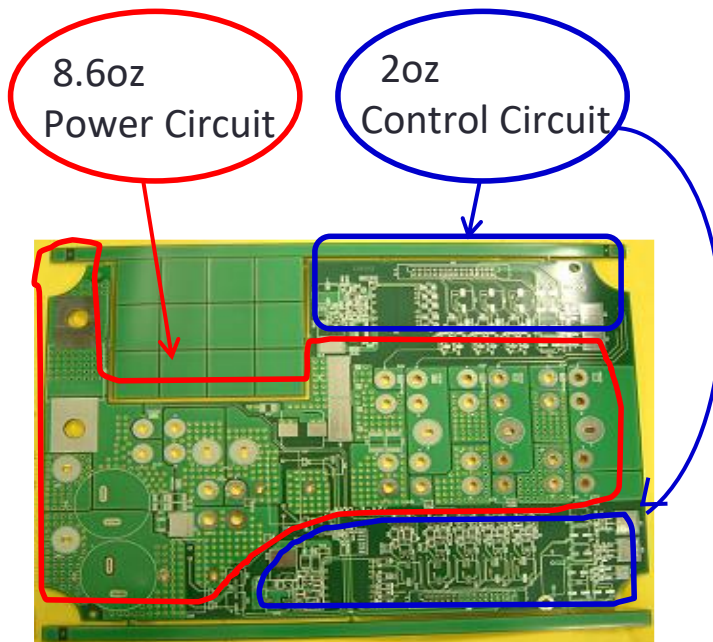


# Combination PCB

High Current

Heat Dissipation

- Copper foil thickness: 8.6oz & 2oz copper on the very same layer
- Number of Layers: 2- 6 Layers
- Board thickness: 0.051" - 0.137" (1.3 - 3.5 mm)
- Available: IVH / To combine less than 11.4oz, 14.3oz and 6.8oz copper is available.
- UL : Certified 



UB022.008

# Bus Bar Embedded PCB

High Current

Heat Dissipation

Bus Bar thickness : 14.3 / 22.8 / 28.5 / 57.1 oz.

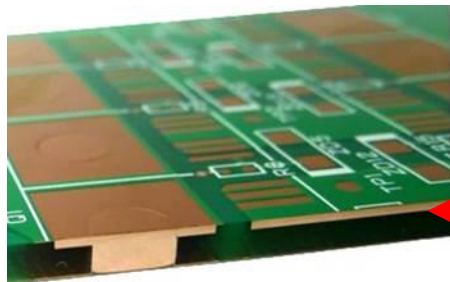
Embedding Bus Bar into Inner layer

Extracting copper and bending copper terminal

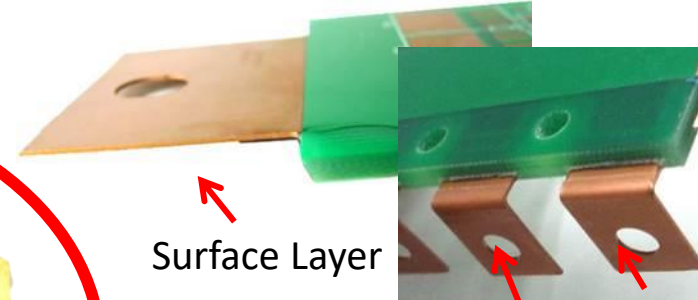
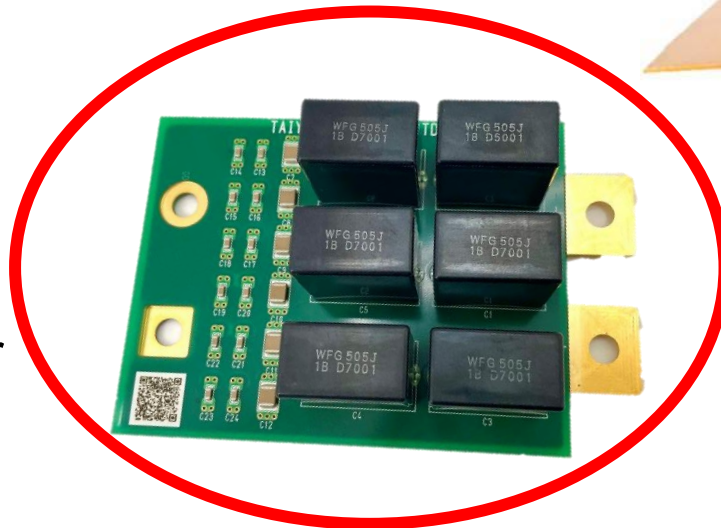


Bus Bar

Embedding Bus Bar into External Layer



Bus Bar



Surface Layer

Layer 2 Layer 3

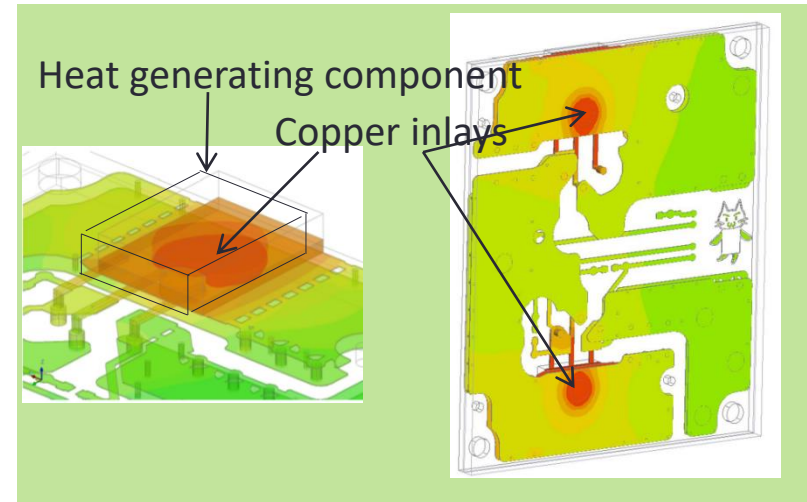
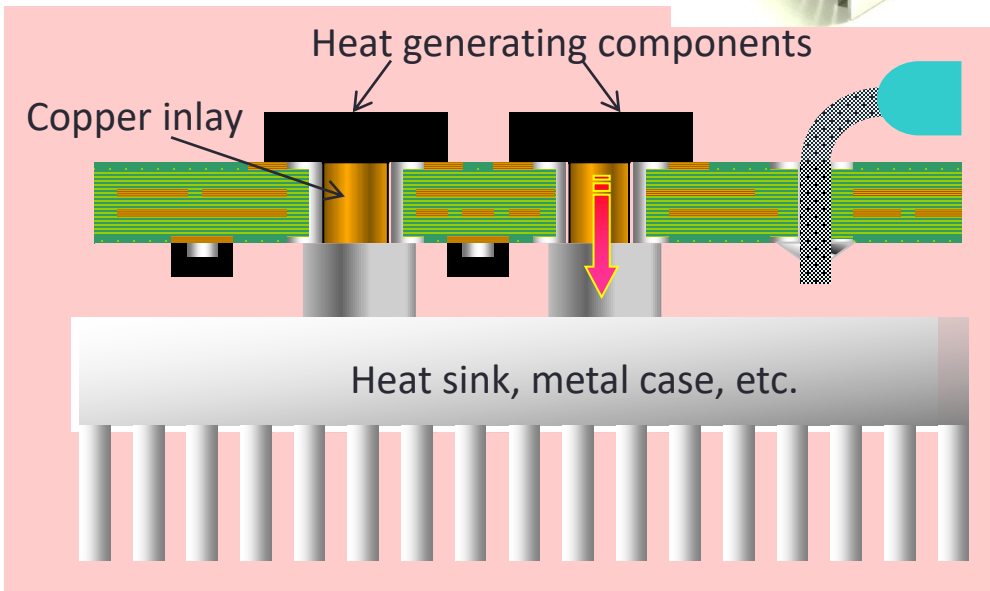
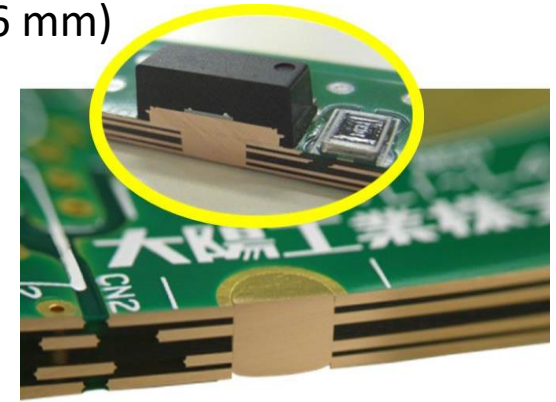
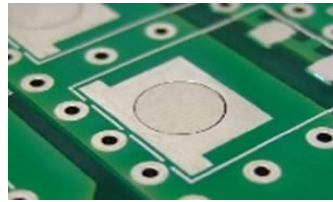


The shape of Bus Bar is flexible.

# Copper Inlay PCB (Heat dissipation PCB for Power device)

Heat Dissipation

- Available for all copper foil thickness
- Diameters of inlay: 0.118"/0.157"/0.196"/0.236" (3 / 4 / 5 / 6 mm)



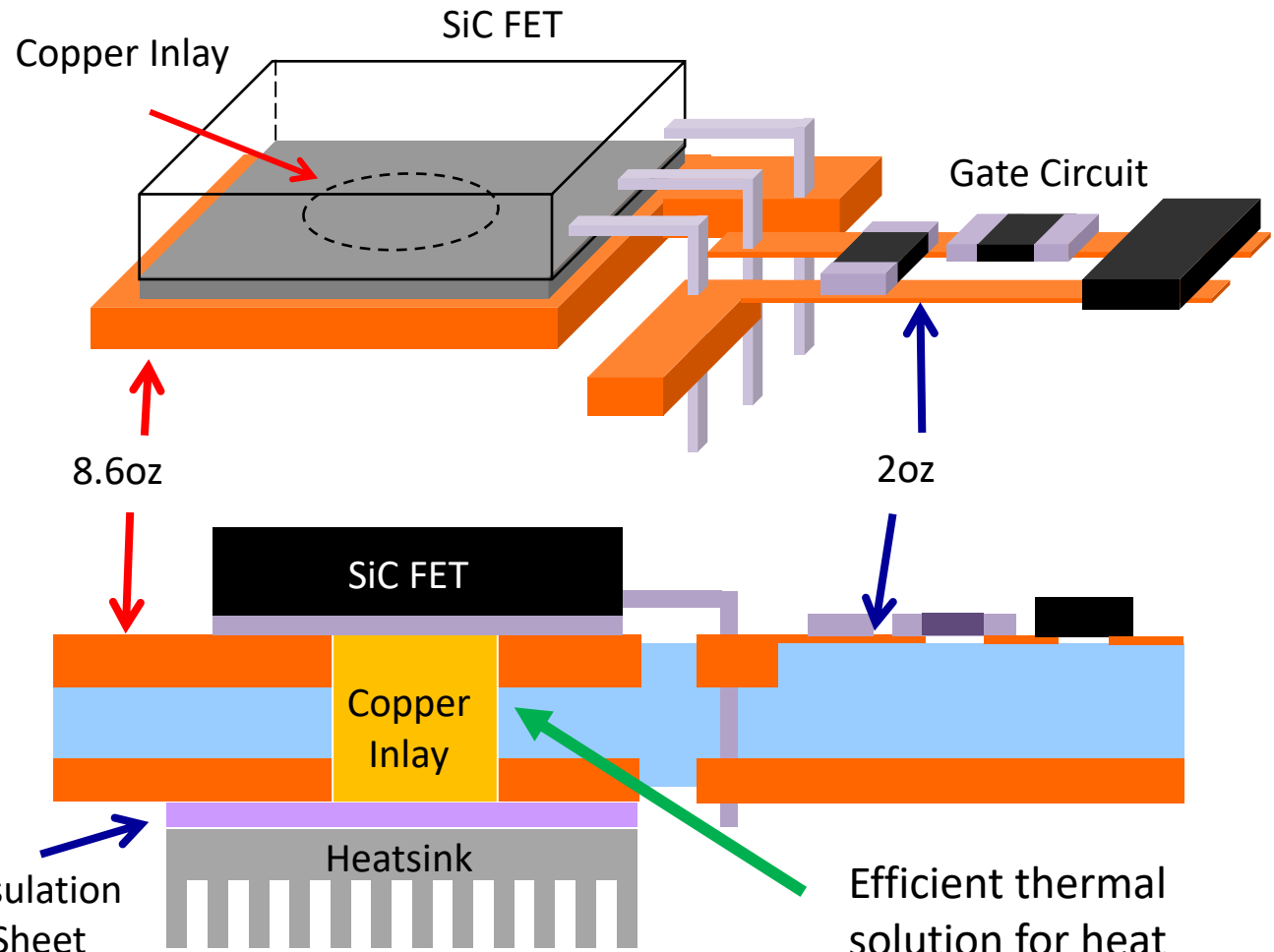
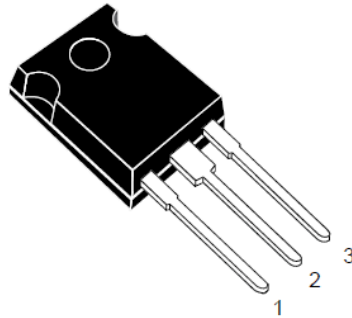
**Realize highly efficient heat dissipation for power device such as SiC and GaN**





# Value of Combination & Copper Inlay PCB

## - DIP type SiC device



Source and Drain  
↓  
Thick Copper 8.6oz

Gate  
↓  
Thin Copper 2oz

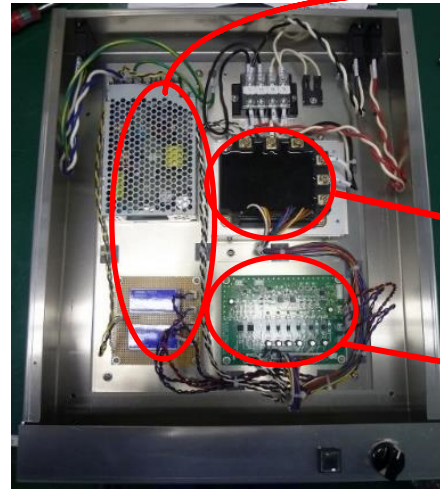
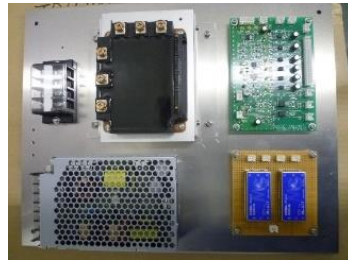


**Combination PCB**

Efficient thermal solution for heat generating parts.



# Before - After / Motor Controller Unit



Converter

IPM

Control  
Circuit



## 【PCB】

0.5oz 2Layers

Parts: One side mounting

## 【IPM】

Commercial Item /  
Cable Connection

## 【DCDC Converter】

Commercial Item /  
Cable Connection

Number of Parts → 16% Reduction  
Volume → 60% Save Space  
Total Cost → 11% Down

## 【PCB】

8.6oz 4Layers / Combination PCB

Parts: Both side mounting

## 【IPM】

Design IPM as a part of circuit  
(Used Discrete IGBT)

## 【DCDC Converter】

Design DCDC Converter  
as a part of circuit

**Integrate all parts to one consolidated PCB!**

# Applications

- Automotive / EV
- Power Supply
- Inverter / Converter
- Renewable Energy
- Power Module
- HVAC
- Motor
- Battery Management System
- Industrial Robot / Humanoid Robot
- Semiconductor manufacturing equipment
- Coil / Planer transformer
- Wireless Power Transfer
- Aerospace



# Taiyo Kogyo Co., Ltd.

↓ Please visit our website. ↓

<https://www.taiyo-technologies.jp/solution/pcb-en>

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