thermal-bond RCF

PROCESS GUIDE

thermal-bond 3.0F (VT-4B3H RCF)

UL Approval: E214381 Version: 01/12/2025

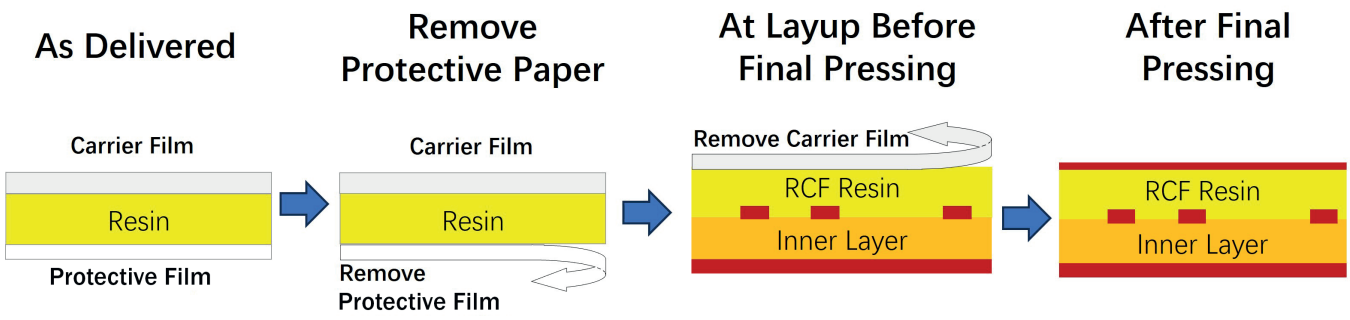
Precautions in Handling

- Storage Condition & Shelf Life

		RCF	
Storage Condition	Temperature	Below 23°C (73°F)	Below 5°C (41°F)
	Relative Humidity	Below 55%	/
Shelf Life		3 Months	6 Months

- The thermal management prepreg should be taken care of when handling and wearing rubber gloves to prevent contamination is strongly recommended during processing.

Product Handling & Press Process Flow



1. Please put RCF on a clean and flat surface with the PET film side up in cleanroom.
2. Please pay more attention to the alignment of RCF colloid edge with the substrate or metal plate.
3. Start from one corner when peeling off the PET film from resin.
4. Then put copper foil or another piece of RCF on the surface.

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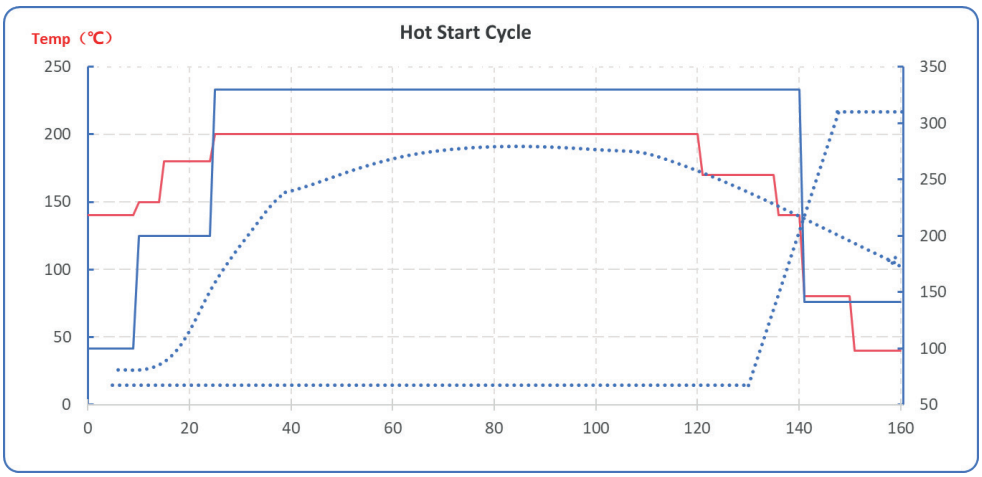
Press Parameters

1. Heating rate (Rate of Rise) of material [Material Temperature]: 1.5~3.5°C/min (2.7~5.4°F/min).
2. Curing Temperature & Time: >60min at more than 180°C (356°F) [Material Temperature].
3. Vacuuming should be continued until over 140°C (284°F) [Material Temperature].
4. Cold Press condition: Keep Plate @ Room Temperature by water; Pressure: 100psi; Keep Time: 60minutes

Product Name	Product Code	Full Pressure (psi)	Full Pressure Temperature (°C)
VT-4B3H RCF	FT-R	≥450	70~85
VT-4B3H RCF	FT-M	≥350	70~90
VT-4B3H RCF	FT-H	≥300	65~95



Baking Recommendation During PCB Process

Process	Purpose	Cycle	Potential Risk
Before HASL, PCB should be separate (not stacked) and supported in a rack for this process. HASL process should be finished within 24 hours after baking finishing.	To eliminate moisture	2 hours @ 125°C	Potential for measling, blister and de-lamination.
Before shipment, if PCB stored for >1 month, PCB should be baked before packaging.	To eliminate moisture	2~4 hours @ 125°C	Potential for measling, blister and de-lamination.

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Typical Drilling Condition

Without Metal Base (only for reference)

Diameter (mm)	Stack Height	Spindle Speed (KRPM)	Feed Rate (mm/s)	Retract Rate (mm/s)	Hit Count
0.15~0.30	1 PNL/stack	125~155	17~33	200~250	1200
0.35~0.40	1 PNL/stack	95~110	40~47	250	1200
0.55~1.00	1 PNL/stack	60~88	47	330	1200
>1.00	1 PNL/stack	50~70	30~47	300	800~1200

- Carbide drill bit is prone to excessive wear, preferably Jinzhou SHD/MDC series drill bit
- Aluminum and Phenolic Board Covers are recommended

With Metal Base (only for reference)

Diameter (mm)	Stack Height	Spindle Speed (KRPM)	Feed Rate (mm/s)	Retract Rate (mm/s)	Hit Count
0.25~0.30	1 PNL/stack	40	25~30	100~200	800
1.0~2.5	1 PNL/stack	36~39	35~50	250~450	200~500
>2.5	1 PNL/stack	30~37	30~40	200~300	200~500

- Carbide drill bit is prone to excessive wear, preferably Jinzhou SHD/MDC series drill bit.
- Recommend Aluminum and Phenolic Board Covers

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Image Transfer

Process	Recommendation
Dry Film	The lamination speed maybe needs slower than standard FR4 to have metal substrate approach proper lamination temperature.
Wet Film	Both aluminum and copper could be coated to protect aluminum during etching process. Follow instruction details of manufacturers
Developing	Masking or film protection on aluminum is better during developing. Follow chemical manufacturer's recommendation.

- Dry film and wet film are both applicable process on aluminum base laminate.
- Before filming, cleaning of panel surface is necessary.
- Wet film process option
  - Curtain
  - Screen

Etching / Stripping

Process	Recommendation
Etching	Alkaline or acid solution (cupric chloride, ferric chloride) are both applicable. Alkaline etching is faster than acid etching and is fit for below 3oz copper. The acid etching performs well on preventing of undercut and over etch.
Stripping	Apply sodium hydroxide solution to remove etch resist and conveying process is preferred.

Solder Masking

Process	Recommendation
Solder masking	Control the thickness between 1~2mil or depends on boards design
Pre-heating	Follow manufacturer's recommendation on the setting of temperature and time. Having a filter system in oven is preferred.
Developing	Solution concentration, temperature and spray pressure need to be controlled.
Curing	Follow the details of temperature and time of manufacturer.

- Roughness of board surface is necessary to get better adhesion between boards and solder mask.
- Both thermal cured and UV cured solder mask are applicable.
- Masking options
  - Screen Printing
  - Curtain Coating
  - Spray Coating
  - Roller Coating

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Surface Finish Options

Process	Recommendation
HASL	The most popular surface treatment method. Peel off the protective film from aluminum before HASL.
OSP	Follow details of manufacturer's recommendation.
ENIG	Popular in wire bonding application. Follow chemistry recommendation to avoid defects of black pad and brickle gold.
Silver Immersion	Silver immersion has a better soldering ability but has disadvantage of silver migration.

Routing

Diameter (mm)	Spindle Speed (KRPM)	Feed Rate (IPM)	Retract Rate (IPM)	Travel Speed (mm/sec)
0.8	37	10~15	30	12~15
1.0	37	10~15	30	10~12
1.2	37	12~18	30	8~10
1.5	36	15~20	30	5~8
2.0	34	15~20	30	3~5

- Backup board – Phenolic is preferred.
- Tools material – Tungsten or Diamond carbite with 2 flutes is preferred
- Stack height – 1 panel / stack
- Consult your tool supplier for more advice.

Punching

- Alloy side is upwards when punching.
- Tonnage – 120T and above is preferred.
- "D1&D2" should be greater than board thickness.
- "D3" should be greater than board thickness + 0.5mm.
- Consult your tool supplier for more advice.