thermal-bond RCF

UL Approval: E214381 Version: 26/06/2025

PROCESS GUIDE

thermal-bond 7.0F (VT-4BC RCF)

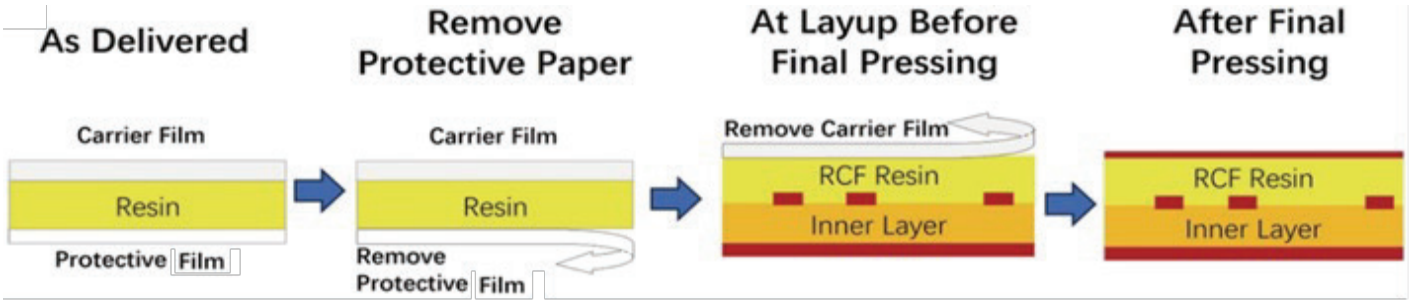
Precautions in Handling

- The thermal management prepreg should be taken care of when handling and wearing rubber gloves to prevent contamination is strongly recommended during processing.
- It is strongly recommended that the remaining loose packages be sealed as soon as possible and stored in a cold storage.

Storage Condition & Shelf Life

		RCF	
Storage Condition	Temperature	Below 23°C (73°F)	Below 5°C (41°F)
	Relative Humidity	Below 55%	/
Shelf Life		/	2 Months

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. When tearing off the PET film from the resin, perform the action gently starting from one corner
4. Then put copper foil or another piece of RCF on the surface
5. It is recommended to be careful when handling

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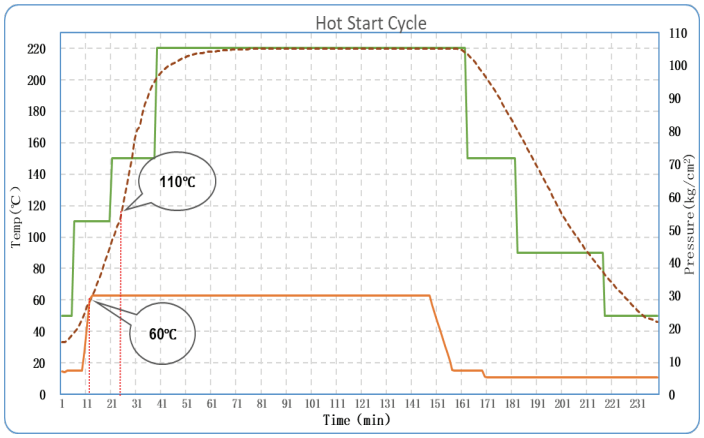
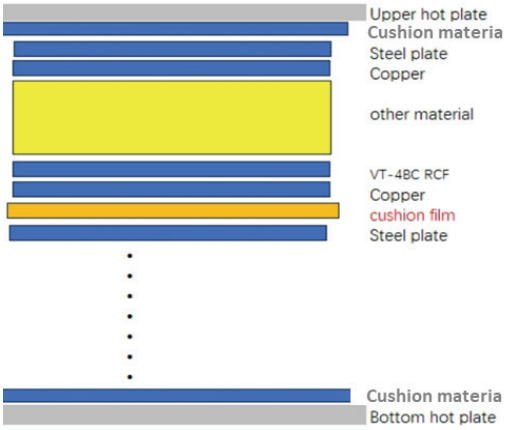
Press Parameters

1. Heating rate (Rate of Rise) of material (60~110°C) [Material Temperature]: 2.5~4.0°C/min
2. Curing Temperature & Time: >80min at more than 180°C [Material Temperature]
3. Full Pressure: ≥420psi, It's should be started before 70°C of material temperature
4. Vacuuming should be continued until over 180°C [Material Temperature]
5. Cold Press condition: Keep Plate @ Room Temperature by water; Pressure: 100psi; Keep Time: 60minutes
6. Also it is recommended to add a three-in-one cushion film between the copper foil and the steel plate on the RCF side





a) Please put RCF on a clean and flat surface with the PET film side up in cleanroom

b) Please pay more attention to the alignment of RCF edge with the substrate or metal plate

c) Start from one corner when peeling off the PET film from resin

Baking Recommendation During PCB Process

Process	Purpose	Cycle	Potential risk without bake
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, purpose to eliminate moisture cycle potential risk 2 hours @ 125°C 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 Conditions

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	1 PNL/stack	155	17	200	800
0.20	1 PNL/stack	145	20	200	800
0.25	1 PNL/stack	130	27	200	800
0.30	1 PNL/stack	125	33	250	800
0.35~0.40	1 PNL/stack	110	40	250	800
0.45	1 PNL/stack	100	47	250	800
0.50	1 PNL/stack	95	47	250	800
0.55	1 PNL/stack	88	47	330	800
0.60	1 PNL/stack	80	47	330	800
0.65	1 PNL/stack	74	47	330	800

a) Carbide drill bit is prone to excessive wear, preferably Jinzhou SHD/MDC series drill bit

b) 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	1 PNL/stack	80	20~25	100~200	600
0.30	1 PNL/stack	40	20~25	100~200	500
0.60	1 PNL/stack	40	25~30	100~200	500
0.7~0.9	1 PNL/stack	40	30~40	300~400	400
1.0~1.5	1 PNL/stack	39	40~50	350~450	300
2.0~2.5	1 PNL/stack	38	35~45	250~350	200

a) Carbide drill bit is prone to excessive wear, preferably Jinzhou SHD/MDC series drill bit

b) 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 filming and wet filming are both applicable process on aluminum base laminate.
- Before filming, cleaning of panel surface is necessary.
- Wet film process options.
  - 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.
- Before filming, cleaning of panel surface is necessary.
- 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 Finishing 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 (mm/s)	Retract Rate (mm/s)	Hit Count
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