PROCESSING GUIDELINES

Laminate: Synamic 6GX
Prepreg: Synamic 6GXB

Halogen free high heat resistance & very low loss Material

This processing guide follows the IPC-4101C standard and is to provide necessary guidance for customer reference, based on Synamic 6GX/Synamic 6GXB material features.

1. Storage Condition

1.1 Laminate core

- **Store Condition**

Pack with original forms on the platform or on the appropriate frame, avoiding stress, prevent sheet deformation caused by inappropriate storage which may impact the subsequent PCB processes.

- **Storage Environment**

Sheets should be stored in ventilated, dry, at room temperature under environment control, avoiding direct sunlight, rain and avoid erosion of corrosive gas (stored environment directly affect the quality of material).

For double-sided copper-clad boards (cores), to minimize shifting as to avoid scratching the surface of the product, with a suitable environment and condition for storage, the shelf life can be up to two years.

- **Operation Manuel**

Wear clean gloves and carefully operate the cores. Copper foil collisions, sliding will cause damage of the cores.

Bare hands action will cause contamination to copper foil surface. These defects are likely to cause adverse effects.

1.2 Prepreg

- **Storage Condition**

Levels stored in original packaging form, avoiding stress, prevent sheet deformation caused by inappropriate storage condition.

Leftover or cut Prepregs should pack and seal with vacuum foil packaging and put it back in the original packaging tray.

- **Storage Environment**

Prepreg sealed packaging should be stored in free of UV irradiation environment, specific storage conditions and the storage period as follows:

Condition 1. At a temperature of <5℃, storage period for 6 months.

Condition 2. At a temperature of <23℃, relative humidity <50% when stored, storage period for 3 months

Note: Relative humidity affect prepreg quality the most, pay special attention on weather (conduct dehumidification process is necessary for wet weather).

- **Cutting Guideline**

Cutting the best way is left to professional staff wear clean gloves during operation, prevent the pollution of prepreg surface; operation must be careful to prevent prepreg wrinkle or crack, to avoid affect prepregs.

- **Prepregs Use Recommendations**

If moving from a low temperature storage space to a higher temperature or ambient temperature storage space, it must go through the temperature settle process, (8 - 24 hours, settle time is varies depending on

temperature variation in between two storage conditions). Open package after temperature settle process is completed as to avoid affecting the quality and adhesion of prepregs.

For PP package stored in above conditions 1 or 2, after open is required to complete the use as soon as possible, for packages opened more than 3 day, it must re-inspect and insure quality before use.

Leftover or cut prepregs should pack and seal with vacuum foil packaging and put it back in the above stated storage condition 1 or 2.

2. PCB Process Recommendations

2.1 Panel Cutting

- Sawing (preferred) and shearing method is recommended. Be careful of potential edge cracks when using roller cutter or caused by improper gap or cutter blade abrasion.

2.2 Thin Core Baking

- Thin core baking depends on actual need. If bake after cutting, it's recommended to rinse cutting panels first, which is able to remove resin powder brought by cutting and avoid etching problem. Baking condition: 150-170℃/3-5h, be sure to avoid contact directly with heater.

2.3 Brown Oxide

- After Brown Oxide treatment, it is recommended to bake 120℃/1-2h as to remove moisture before press lamination process. Material should be used within 4 hours after baking.

2.4 Lay-up

- Ensure the prepregs direction of warp and fill at lay-up process. Avoid flipping the prepregs during lay-up process to reduce warping, deforming and folding issues.
- Suggest control time range from lay-up to lamination within 2 hours.
- Suggest bake cushion materials when there's moisture absorption risk.
- Pay attention to electrostatic adhesion of foreign material on the prepregs.

2.5 Lamination

- For multilayer pressing, it's recommended to keep heat-up rate at 3-4℃/min when material temperature at 80-140℃.
- Suggest full pressure set for 350-450psi when material temperature is at 100-120℃.
- Curing condition: temperature 190-200℃, time 100-130min.
- Cooling rate: lower than 2℃/min.
- Notify SYTECH in advance if use copper heat conductive press machine.
- For HDI and N+N boards, suggest add cushion paper in between Book to ensure better thickness consistency.

- If unclad or single-sided core materials are used in multi-layer lamination, surface roughening should be conducted to avoid lack of adhesion.

2.6 Drill

- New drill bit, single stack and hit count reduction is recommended for getting better hole quality. Besides, reduce chip load 10-20% when compared to standard FR-4. Run trials to get proper drill parameters are necessary. Below parameters are for reference.

Table 1: Drilling parameters (reference only)

Diameter	Speed	Infeed	Chipload	RTR	Max hits
(mm)	(krpm)	(ipm)	(mil/rev)	IPM	H
0.20	108	70	0.65	300	500
0.25	108	70	0.65	300	500
0.30	105	75	0.71	500	500
0.35	98	58	0.59	500	500
0.40	98	62	0.63	600	800
0.50	95	75	0.79	800	800
0.60	90	68	0.76	800	800
0.70	80	70	0.88	800	800
0.80	68	72	1.06	800	800
0.90	62	75	1.21	800	800
1.00	60	75	1.25	800	800

- For dense holes area or hole size <0.6mm, LE aluminum cover layer is recommended.
- On high layer count technologies and thicker overall board thicknesses, peck drilling parameters may be necessary.
- Suggest baking after drill 180-190℃/3h, in racks, and avoid contact of heater directly.

2.7 Desmear

- Due to material composition and structure, its chemical resistance is good. Only taking chemical desmear is difficult to remove smear effectively, so both plasma and chemical desmear are advised.
- Detailed parameters follow the actual PCB structure (overall thickness, hole diameter) for setting.

Table 2: Plasma parameters (Reference only)

Step	O_2	CF_4	N_2	Vacuum	Watts	Flow Rate	Step time	Temp
	L/min	L/min	L/min	MTORR	W	L/min	Min	℃
1	2.25	/	0.25	250	9000	2.5	45	80
2	2.45	0.3	0.25	250	6500	3.0	15	105
3	2.50	/	/	250	5000	2.5	5	100

2.8 HASL

- Synamic 6GX is compatible for lead-free HASL process.

2.9 Routing/Punching

- Routing process is recommended. Reduce routing speed to prevent edge cracks from outburst mechanical force.
- Punching is NOT recommended for Synamic 6GX.

3. Soldering

3.1 Shelf life of PWB

- 3 months with packaging protection.
- Suggest bake at 130-140℃/4~6h prior to assembly.

3.2 Reflow

- Synamic 6GX is compatible for lead-free reflow process

This process guide is for reference only! Should you have any questions, please feel free to contact us.