PROCESSING GUIDELINES

Laminate: S7045GX

Prepreg: S7045GXB

Low CTE, Lower Mid-loss Material

- This processing guideline is based on the IPC-4101E standard and has been tailored according to the actual characteristics of the product to optimize its application for SYTECH S7045GX/S7045GXB materials.

1. Storage condition

1.1 Laminate

1.1.1 Storage method

- Store in original packaging on a flat platform or suitable rack. Avoid heavy stacking or other incorrect storage method to prevent warpage.

1.1.2 Storage condition

- Store in a ventilated, dry, room-temperature environment. Avoid direct sunlight, rain, and corrosive gases (Storage conditions directly impact material quality).
- Double-sided boards stored under suitable conditions for ≤2 years and single-sided boards for ≤1 year meet IPC-4101E performance requirements.

1.1.3 Handling

- Handle with clean gloves. Impact or sliding may damage copper foil. Naked hand contact may contaminate surfaces. All above defects may bring bad effects during production.

1.2 Prepreg

1.2.1 Storage method

- Store horizontally in original packaging. Avoid heavy stacking or other incorrect storage method to prevent prepreg from being damaged.
- After cutting, reseal leftover roll prepreg with plastic film and return to original packaging tray.

1.2.2 Storage condition

- All prepreg should be stored at either of below conditions with sealed package and without any influence of UV light.
- Condition 1: 3 months when stored at <23℃ and <50% RH.
- Condition 2: 6 months when stored at <5℃.
- Be careful of RH due to its obvious effect on prepreg quality. When packaging is open, it's recommended using up within 8 hours.

1.2.3 Prepreg cutting

- Cut by the professionals with clean gloves would be better which to avoid contamination of the surface, also need to be carefully to operate which prevent wrinkles or creases.
- Clean the stack-up table or cutting machine surface before cutting to avoid cross contamination of

different types of PP powder.

1.2.4 Usage Notes

- When brought out from cooling warehouse, prepreg should be stabilized to ambient temperature before opening package, keep at least 8 hours is recommended, depending on specified store condition.
- For panel form prepreg after cutting, all should be kept under condition 1 or 2 and used up ASAP. When exceeding 3 days, it's must re-inspect and insure quality before use.
- Leftover or cut prepregs should be packed and sealed with vacuum foil pack and put it back in the above storage condition 1 or 2.
- For IQC inspection, prepreg should be finished all tests within 5 day from the date of acceptance according to IPC-4101C specification.

2. PWB Processing

2.1 Panel cutting

- Sawing and shearing method is recommended. Must be careful of stress damage caused by the roller cutter during cutting, which may lead to potential delamination of the board edge.

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.
- Recommended for baking condition: 150-175℃/3-5h, be sure to avoid contact directly with heater

2.3 Brown Oxide

- Brown oxide is recommend.
- Bake after brown oxide: 120℃/1-2h, and lay-up within 4 hours after baking.
- For multilayer board:

  A: Bake before brown oxide: 120℃/3-5h.

  B: Bake after brown oxide: 110-120℃/1.5-2h.
- Baking stack height: ＜1 inch.

2.4 Lay-up

- Confirm prepreg direction of warp and fill at lay-up process. Avoid prepreg reversal or overturn in case of multilayer board distortion after press.
- The time from stacking the boards to entering the press should be controlled within 2 hours.
- The overall time from the browning of the core board to start of pressing is controlled within 8 hours.
- When there is a risk of moisture of absorption in the buffering material, it is recommended to dry it.
- Due to the material properties, it is prone to static electricity. When stacking, special attention should be

paid to the adsorption of foreign objects on prepreg.

- To ensure good alignment of expansion and contraction during board placement, it is recommended to use rivets for fixation. When it is necessary to fix the fusion method, it is recommended to use electromagnetic thermal fusion and carefully evaluate the optimal fusion effect parameters. Other fusion methods require a rigorous and detailed evaluation of the fusion effect based on the PCB's own conditions to avoid layer deviation caused by poor fusion.

2.5 Press process

- Advised heat-up rate: 2-3℃/min (product temperature ranged 80℃-140℃).
- Full pressure is recommended at 350-450 PSI (25-32kgf/cm^2), specified value should be determined by multilayer feature (lay-up construction and resin filled area). Apply full pressure when product temperature 100-130℃.For thick copper with a thickness of 3oz or more, advised heat-up rate: 3-4℃/min (product temperature ranged 80℃-140℃), full pressure is recommended at 430-570 PSI(30-40kgf/cm^2), apply full pressure when product temperature 80-100℃.
- Curing condition: Product temperature 200-210℃, 100-130min.
- Cooling rate<2℃/min.
- If using a copper foil thermal press machine, please notify SYTECH in advance.
- For HDI and N+N boards: To ensure better thickness uniformity, it is recommended to evaluate the method of adding buffer paper to the middle layer of the Book.
- Considering the high resin filling characteristics of this product, for stack-ups of >/=3oz thick copper and buried copper structures, it is recommended to increase RC2% for the relevant PP on the basis of the same thickness specification as ordinary mid-loss materials.
- When taken singe side or dummy panel for multilayer, be sure to roughen the unclad surface before use in case of poor bonding due to smooth surface. Etching from double sided laminates for that purpose is an optimized measure.

2.6 Drilling

- New drill bit and 1 panel/stack (thick board) is recommended, to ensure good hole wall quality. In addition, based on the ordinary FR-4 drilling parameters, it is recommended to reduce the falling speed by 10-20% appropriately to test the optimal drilling parameters suitable for your company. The following drilling parameters are for reference:

Diameter	Speed	Infeed	RTR	Max hits
(mm)	(krpm)	(ipm)	IPM	H
0.20	97	56	300	500
0.25	120	86	300	500
0.30	95	70	500	500
0.35	88	58	500	500
0.40	88	62	600	500

- When drilling dense holes or holes with a diameter less than 0.6mm, it is recommended to use LE aluminum sheet for the cover plate aluminum sheet.
- Suggest specifying a drilling rig with good performance (stable swing test, good suction force, etc., such as Hitachi/Schmoll).
- When the board thickness is greater than 3.0mm, it is recommended to use step-by-step drilling, pre drilling, or butt drilling processes.

2.7 Baking after drill

- It is recommended to dry the plate after drilling: 180~190 ℃/3 Hour/rack. Note that the plate cannot contact the heat source directly.

2.8 Desmear

- Due to the composition and structure of the material, it has good chemical resistance, and potassium permanganate is difficult to bite the material. It is recommended to use Plasma+potassium permanganate to remove drilling stains. The specific parameters need to be set according to the actual PCB structure (board thickness, aperture size).
- For specific plasma parameters and chemical Desmear parameter conditions, it is necessary to conduct a detailed investigation and evaluation based on PCB solution and equipment production capacity, in order to set the most matching processing parameters that meet the requirements of hole wall quality and related quality; The following Plasma parameters are for reference only.

Step	O_2	CF_4	N_2	Vacuum	Power	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

- The specific desmear conditions are related to the equipment, chemicals type, board thickness or hole area, and need to be set by comprehensive evaluation.
- On the premise of full load, it is suggested applying longer Plasma time for thicker board.

2.9 Ultrasonic water washing

- Recommended to perform ultrasonic water washing and drying after plasma treatment at a speed of 2.0m/min.

2.10 HAL

- Suitable for lead free HAL process.

2.11 Appearance Processing

- Recommended to use a milling machine for processing, and it is not recommended to use a blade method for processing. The lifespan of the blade is reduced by 20% compared to conventional FR-4 materials.

2.12 Packaging

- Suggest baking finished boards at 125-135℃/3~5h before packaging to prevent moisture effect.
- Use aluminum foil vacuum packaging for packaging materials is recommend.

3. PCB Soldering

3.1 Shelf life of PCB

- 3 months with packaging protection. Aluminum foil vacuum packaging, with a validity period of 3 months.
- Would be better to bake the components at 130-140℃ for 3-5 hours before using.

3.2 Reflow

- Suitable for lead free reflow process.

This processing guidelines is for reference only! Should you have any questions, please feel free to contact us. SYTECH will support you with prompt and effective service.