

# GA-HF-15 / GA-HFB -15

無鹵素環氧樹脂覆銅箔基板及半固化片  
Halogen free epoxy resin CCL and prepreg

## ■ 產品特點

- 無鹵素阻燃, Tg150°C(DSC).
- 燃燒過程中不放出高毒性的 Dioxins.
- 無銻,燃燒時無毒性物質產生.
- 優良的耐熱性能和低 Z 軸膨脹系數.
- 耐金屬離子遷移性.

## Features

- Halogen-free and Tg150°C(DSC).
- Absence of highly toxic dioxins during waste burning.
- Antimony-free, no toxic evolution during waste burning.
- Outstanding Thermal resistance and Low Z-CTE.
- CAF resistance.

## ■ 規格說明

## Specification Introduction

GA-HF-15	無鹵單雙面覆銅板(Tg145)(Halogen free single or double side CCL)	ANSI 等級: FR-4 ANSI grade: FR-4
GA-HF-15	無鹵多層線路板用芯板(Tg145) (Halogen free thin core for multi-layer PCB)	
GA-HFB -15	無鹵多層線路板用半固化片(Tg145) (Halogen free prepreg for multi-layer PCB)	

## ■ 產品(GA-HF-15)性能表(符合 IPC-4101B/94)

### Performance List for GA-HF-15 (Specification: IPC-4101B/94)

Characteristic		Unit	Conditioning	Typical Values	SPEC.
Permittivity (RC42.5%)	1MHz	-	C-24/23/50	4.9	5.4↓
	1GHz			4.7	
Loss Tangent (RC42.5%)	1MHz	-	C-24/23/50	0.012	0.035↓
	1GHz			0.014	
Water Absorption		%	D-24/23	0.10-0.15	0.35↓
Flammability		---	C-24/23/50+E-24/125	94 V-0	94 V-0
Peel Strength	HTE 1OZ	Lb/in (N/mm)	288°C×10sec solder floating	7~10 (1.20~1.80)	6↑ (1.05↑)
	RTF 1OZ			6~8 (1.05~1.40)	4.0↑ (0.70↑)
Flexural strength	LW	N/mm <sup>2</sup>	A	480↑	415↑
	CW	N/mm <sup>2</sup>	A	400↑	345↑
Z-axis Coefficient of Thermal Expansion	before Tg	ppm/°C	TMA	35	-
	after Tg	ppm/°C		220	-
Total Z-axis CTE(50~260°C)		%			3.0
T288		Min	TMA	60↑	-
Td(5% weight loss)		°C	TGA	360	-
Glass Transition Temperature		°C	DSC	150↑	-
Cl Content (Resin Content=43.0%)		ppm	---	350↓	900↓
Br Content (Resin Content=43.0%)		ppm	---	Below instrumentation threshold	900↓

Note: For GA-HF-15, the average value in the table refers to samples of 0.040" 1/1.

## ■ UL 認證申請中(Under UL Certification)

## ■ 基板標準規格 Normal Product Size & Thickness

THICKNESS INCH(mm)	COPPER CLADDING OZ((m)		SIZE		THICKNESS TOLERANCE
	INCH	mm	INCH	mm	
0.002 (0.051)	1/3(12)	0.5(17)	36.5×48.5	0930×1240	IPC4101B Class C/M
to	1.0(35)	2.0(70)	40.5×48.5	1030×1240	
0.125 (3.2)	3.0(103)	4.0(137)	42.5×48.5	1080×1240	

Note: The effective area of laminate is 36"(Grain) ×48", 40"(Grain) ×48", 42"(Grain) ×48".