



**Glass cloth base epoxy resin  
flame retardant copper clad laminate**

**FR-4-86PY**

**FEATURES**

- Excellent dimensional stability, through-hole reliability and warp/twist.
- Excellent electrical, chemical and heat resistance properties
- IPC-4101C specification is applicable.
- High CTI value
- Other properties are similar to FR-4-86.

**PERFORMANCE LIST**

Characteristics	Unit	Conditioning	Typical Values	SPEC	Test Method	
Volume resistivity	MΩ-cm	C-96/35/90	$5.0 \times 10^8 \sim 5.0 \times 10^9$	$5 \times 10^6 \uparrow$	2.5.17	
Surface resistivity	MΩ	C-96/35/90	$5.0 \times 10^6 \sim 5.0 \times 10^7$	$10^5 \uparrow$	2.5.17	
Permittivity 1MHZ	-	C-24/23/50	4.5~4.7	5.4 ↓	2.5.5.9	
Permittivity 1GHZ	-	C-24/23/50	4.0-4.2	-	2.5.5.9	
Loss Tangent 1MHZ	-	C-24/23/50	0.010~0.016	0.035 ↓	2.5.5.9	
Loss Tangent 1GHZ	-	C-24/23/50	0.010-0.016	-	2.5.5.9	
Arc resistance	SEC	D-48/50+D-0.5/23	120 ↑	60 ↑	2.5.1	
Dielectric breakdown	KV	D-48/50	60 ↑	40 ↑	2.5.6	
Water absorption	%	D-24/23	0.05~0.10	0.35 ↓	2.6.2.1	
Flammability	-	C-48/23/50	94V0	94V0	UL94	
Peel strength 1 oz	lb/in	288°Cx10" solder floating	8-12	6 ↑	2.4.8	
Thermal stress	SEC	288°C dipping	200 ↑	10 ↑	2.4.13.1	
Flexural strength	LW	N/mm <sup>2</sup>	A	480~550	415 ↑	2.4.4
	CW	N/mm <sup>2</sup>	A	415~480	345 ↑	2.4.4
Dimensional stability X-Y axis	%	E-0.5/170	0.005~0.030	0.05 ↓	2.4.39	
Coefficient of thermal expansion						
Z-axis before Tg	ppm/°C	TMA	50-70	N/A	2.4.24	
Z-axis after Tg	ppm/°C	TMA	250-350			
Glass transition temp	°C	DSC	140 ± 5	N/A	2.4.25	
Comparative Tracking Index	V	C-96/20/65	600	PLC 0	ASTM D-3638	
Decomposition Temperature (Td 5% W/L)	°C	TGA	310-	N/A	2.4.24.6	

**NOTE:**

The average value in the table refers to samples of .062" 1/1.  
Test method per IPC-TM-650

Data shown are nominal values for reference only

**CERTIFICATION UL**

- UL File No. : E98983
- ANSI TYPE:No ANSI