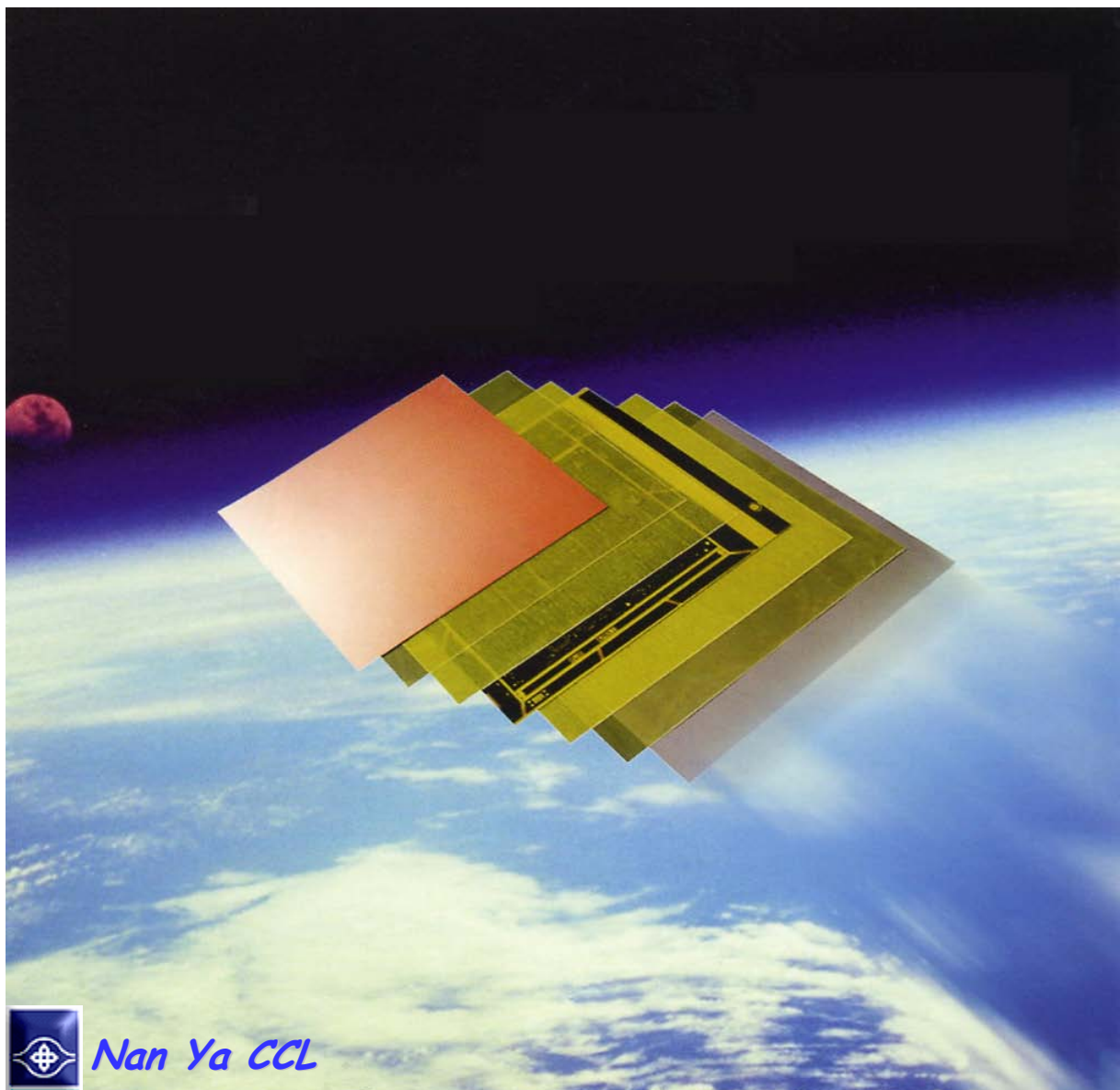


# TECHNOLAM®

*the laminate company*

## Data sheet FR-4-86 UV BLOCK

- multifunctional laminates with a Tg of 140 °C (DSC)
- exceptionally consistent laminate quality due to exclusive use of Nan Ya's raw materials
- common PTH process parameters results in very good through hole reliability and copper foil peel strength
- high luminance of epoxy contrast with copper for laser type AOI
- IPC-4101B / 21, CTI: PLC 3 = 175 V ~ 249 V



*Nan Ya CCL*

# FR-4-86 UV BLOCK



Revision Date: August 2007

## NAN YA SPECIFICATION SHEET FOR FR-4-86 UV BLOCK - Medium Tg Multifunctional Epoxy Laminates

SPECIFICATION SHEET #:	IPC- 4101 / 21
CURING AGENT:	Dicy
FLAME RETARDANT MECHANISM:	Bromine, UL94 V-0
FILLERS:	N/A
ID REFERENCE:	UL/ANSI: FR-4 / 21

LAMINATE DATA SHEET							
Laminate Properties	Specification <0,50 mm [0,0197 in] 50% RC		Specification ≥0,50 mm [0,0197 in] 40% RC		Units metric [English]	Test Method (IPC-TM-650)	Ref. Para.
	Typical Value	Specification	Typical Value	Specification			
Glass Transition Temperature (Tg) by DSC / TMA spec min.			140±5 / 130	110 - 150	°C	2.4.25	3.10.1.6
Decomposition Temperature (Td) TGA 10 °C/min (5% wt. Loss) (onset wt. loss)			311	-	°C	ASTM D3850	3.10.1.10
Decomposition Temperature (Td) TGA 20 °C/min (5% wt. Loss) (onset wt. loss)			324	-	°C	ASTM D3850	3.10.1.10
CTE, Z-axis	Pre-Tg		50 - 70	AABUS	ppm/°C	2.4.24	3.10.1.11
	Post-Tg		250 - 350	-			
CTE, X - Y axis	Pre-Tg		15 - 18	AABUS	ppm/°C	2.4.24	3.10.1.11
	Post-Tg		15 - 18	-			
% Z-Axis Expansion (50 °C - 260 °C)			4,2	AABUS	%	2.4.24	3.10.1.11
Thermal Conductivity			0,49	-	W/mK	-	-
Thermal Resistance: Time to Delamination (100 °C/min)	T260		15 - 25	-	minutes	2.4.24.1	3.10.1.12
	T288		2 - 5	-			
Pressure Cooker - 2 hours (10 s solder dip @ 288 °C)			Pass	Pass Visual	Pass Visual	-	-
CAF Resistance			Pass	AABUS	Pass/Fail	2.6.25	3.12.1.4
Peel Strength, minimum							3.9.1.1
A. Low profile copper foil and very low profile copper foil - all copper foil >17µm [0,669 mil]			-	0,70 [4,00]	N/mm [lb/in]	2.4.8	
B. Standard profile copper foil 1. After thermal stress (35 µm) 2. At 125 °C [257 °F] 3. After process solutions			1,75 [10,00]	1,05 [6,00]	N/mm [lb/in]	2.4.8.2	3.9.1.1.1
			-	0,70 [4,00]	N/mm [lb/in]	2.4.8.3	3.9.1.1.2
			-	0,80 [4,57]	N/mm [lb/in]	2.4.8	3.9.1.1.3
			-	AABUS			
C. All other foil - composite							
Volume Resistivity, minimum	A. C-96/35/90		5,0*10 <sup>8</sup>	-	MΩ-cm	2.5.17.1	3.11.1.3
	B. After moisture resistance		-	10 <sup>6</sup>			
	C. At elevated temperature E-24/125		-	10 <sup>3</sup>			
Surface Resistivity, minimum	A. C-96/35/90		5,0*10 <sup>6</sup>	-	MΩ	2.5.17.1	3.11.1.4
	B. After moisture resistance		-	10 <sup>4</sup>			
	C. At elevated temperature E-24/125		-	10 <sup>3</sup>			
Moisture Absorption, maximum			0,10	0,80	%	2.6.2.1	3.12.1.1
Dielectric Breakdown, minimum			60	40	kV	2.5.6	3.11.1.6
Permittivity, spec. maximum (Laminate & prepreg as laminated)	A. @ 1MHz		4,70	5,40	-	2.5.5.2	3.11.1.1
	B. @ 100MHz		-	-	-	2.5.5.3	3.11.2.11
	C. @ 1 GHz		-	-	-	2.5.5.9	
	D. @ 2 GHz		-	-	-	2.5.5.5	
	E. @ 5 GHz		-	-	-	-	
Loss Tangent, spec. maximum (Laminate & prepreg as laminated)	A. @ 1MHz		0,020	0,035	-	2.5.5.2	3.11.1.2
	B. @ 100MHz		-	-	-	2.5.5.3	3.11.2.2
	C. @ 1 GHz		-	-	-	2.5.5.9	
	D. @ 2 GHz		-	-	-	2.5.5.5	
	E. @ 5 GHz		-	-	-	-	
Flexural Strength, minimum	A. Length direction		480-550	415 [60190]	N/mm <sup>2</sup> [lb/in <sup>2</sup> ]	2.4.4	3.9.1.3
	B. Cross direction		415-480	345 [50040]			
Flexural Strength at Elevated Temperature, length direction, minimum			-	-	N/mm <sup>2</sup> [lb/in <sup>2</sup> ]	2.4.4.1	3.9.1.4
Dimensional stability x - y axis E-0,5/170(R)/E-4/105(TL)			0,005-0,030	< 0,05	%	2.4.39	3.9.1.2
Arc Resistance, minimum			120	60	s	2.5.1	3.11.1.5
Thermal Stress 10 s at 288 °C [550,4 °F], minimum	A. Unetched		Pass	Pass Visual	rating	2.4.13.1	3.10.1.2
	B. Etched		Pass (200 s)	Pass Visual			
Electric Strength, minimum (Laminate & prepreg as laminated)			-	-	kV/mm [V/mil]	2.5.6.2	3.11.1.7
			-	-			3.11.2.3
Flammability (Laminate & prepreg as laminated)			V-0	V-1 minimum	rating	UL94	3.10.1.1
Density (50 % resin content)			1,92	-	g/cm <sup>3</sup>	-	-

PREPREG DATA SHEET					
Prepreg Requirements	Typical Value	Specification	Units	Test Method	Ref. Para.
1. Shelf Life, minimum (Condition 1/Condition 2)			days	AABUS	3.17
2. Reinforcement					
3. Volatile content maximum			%	2.3.19	3.9.2.8
4. Prepreg Parameters			AABUS	AABUS	1.1.7
5. Flammability (as laminated)			rating	UL94	3.10.2.1
6. Other					

Data shown are nominal values for reference only

\*AABUS = As Agreed upon Between User and Supplier.

All Nan Ya laminates are in conformance with RoHS regulations