

Data Sheet

FR-4-86 UV BLOCK

- Multifunctional Laminates, Tg 140 °C (DSC)
- Exceptional consistent laminate quality due to exclusive use of Nan Ya's raw materials
- Common PTH process parameters result in very good through hole reliability and copper foil peel strength
- High luminance of Epoxy contrast with Copper for Laser Type AOI
- IPC-4101C specification sheet 21 is applicable

FR-4-86 UV BLOCK

Revision Date: April 2011

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

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

LAMINATE DATA SHEET

Laminate Properties	Specification	Specification $\geq 0,50$ mm [0,0197 in] 40% RC		Units metric [English]	Test Method (IPC-TM-650)	Ref. Para.
		Typical Value	Specification			
Glass Transition Temperature (Tg) by DSC / TMA		140 \pm 5 / 130	≥ 110	$^{\circ}$ C	2.4.25	3.10.1.6
Decomposition Temperature (Td) TGA	5% wt. loss onset wt. loss	310 305	- -	$^{\circ}$ C	2.4.24.6	3.10.1.8
CTE, z-axis	prior Tg above Tg	50 - 70 250-350	- -	ppm/ $^{\circ}$ C	2.4.24	3.10.1.11
CTE, x/y-axis	prior Tg above Tg	15 - 18 15 - 18	- -	ppm/ $^{\circ}$ C	2.4.24	3.10.1.11
Thermal Expansion (50 $^{\circ}$ C - 260 $^{\circ}$ C) z-axis	TE	4,2	-	%	2.4.24	3.10.1.11
Thermal Conductivity	λ	0,49	-	W/mK	Laser Flash	-
Thermal Resistance: Time to Delamination	T260 T288	20-30 2 - 5	- -	minutes	2.4.24.1	3.10.1.12
Pressure Cooker Test - 2 hours (10 s solder dip @ 288 $^{\circ}$ C)		pass	pass visual	pass visual	-	-
Thermal Stress 10 s at 288 $^{\circ}$ C [550,4 $^{\circ}$ F], minimum	A. unetched B. etched	pass pass	pass visual pass visual	rating	2.4.13.1	3.10.1.2
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 $>17\mu\text{m}$ [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)		1,75 [10,00]	1,05 [6,00]	N/mm [lb/in]	2.4.8.2	3.9.1.1.1
2. at 125 $^{\circ}$ C [257 $^{\circ}$ F]		-	0,70 [4,00]	N/mm [lb/in]	2.4.8.3	3.9.1.1.2
3. after process solutions		-	0,80 [4,57]	N/mm [lb/in]	2.4.8	3.9.1.1.3
C. all other foil - composite		-	AABUS			
Volume Resistivity, minimum						
A. C-96/35/90		5,0*10 ⁸	-	M Ω cm	2.5.17.1	3.11.1.3
B. after moisture resistance		-	10 ⁶			
C. at elevated temperature E-24/125		-	10 ³			
Surface Resistivity, minimum						
A. C-96/35/90		5,0*10 ⁶	-	M Ω	2.5.17.1	3.11.1.4
B. after moisture resistance		-	10 ⁴			
C. at elevated temperature E-24/125		-	10 ³			
Dielectric Breakdown, minimum		60	40	kV	2.5.6	3.11.1.6
Electric Strength, minimum		-	-	kV/mm	2.5.6.2	3.11.1.7
(laminated & prepreg as laminated)		-	-	[V/mil]		3.11.2.3
Arc Resistance, minimum		120	60	s	2.5.1	3.11.1.5
Comparative Tracking Index (CTI)		3 / 175 - 249	-	PLC / V	ASTM D3638	-
Permittivity, spec. maximum	A. @ 1MHz B. @ 100MHz C. @ 1 GHz D. @ 2 GHz E. @ 5 GHz	4,60 - 4,10 - -	5,40 - - - -	- - - - -	2.5.5.2 2.5.5.3 2.5.5.9 2.5.5.5	3.11.1.1 3.11.2.11
Loss Tangent, spec. maximum	A. @ 1MHz B. @ 100MHz C. @ 1 GHz D. @ 2 GHz E. @ 5 GHz	0,017 - 0,013 - -	0,035 - - - -	- - - - -	2.5.5.2 2.5.5.3 2.5.5.9 2.5.5.5	3.11.1.2 3.11.2.2
Flexural Strength, minimum	A. Length direction B. Cross direction	480-550 415-480	415 [60190] 345 [50040]	N/mm ² [lb/in ²]	2.4.4	3.9.1.3
Flexural Strength at elevated temperature, length direction, minimum		-	-	N/mm ² [lb/in ²]	2.4.4.1	3.9.1.4
Dimensional stability x/y-axis E-0,5/170(R)/E-4/105(TL)		0,005 - 0,03	$< 0,05$	%	2.4.39	3.9.1.2
Moisture Absorption, maximum		0,10	0,80	%	2.6.2.1	3.12.1.1
Flammability (laminated & prepreg as laminated)		V-0	V-0 minimum	rating	UL94	3.10.1.1
Density (50 % resin content)		1,92	-	g/cm ³	-	-

PREPREG DATA SHEET

Prepreg Requirements	Typical Value	Specification	Unit	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, no review according MIL-S-13949

*AABUS = As Agreed upon Between User and Supplier.

all Nan Ya laminates are in conformance with RoHS regulations