Panasonic Electric Works Electronic Materials Europe GmbH
Specification Sheet

Specifiction sheet #	IPC-4101B/126		
Reinforcement	**1:** Woven E-Glass	**2:**	N/A
Resin System:	**Primary:** Epoxy		
	Secondary 1: Multifunctional Epoxy	**Secondary 2:**	Modified Epoxy
Flam retardant mechanism	Bromine	**Minimum UL94 Requirement: V0**	
Fillers:	Inorganic fillers		
ID Reverence:	**UL/ANSI:** FR-4	**Mil-S-13949:**	/
	ANSI: FR4 / 126		
Glass transition (TG):	170°C minimum		

Product name	**Laminate:** R-1755V	**Prepreg:** R-1650V
UL - Designation	R-1755V	R-1650V

1. Laminate		**IPC Specification < 0, 5mm**	**IPC Specification >= 0, 5mm**	**Units**	**Typical Values < 0, 5mm**	**Typical Values >= 0, 5mm**	**Methode IPC-TM-650 (or as noted)**
Physical Property							
Peel strength, minimum							
A: Low profile and very low profile copper foil, all copper foils > 18µm	18µm	0,7	0,7	N/mm	-	-	2.4.8
B: Standard profile copper foil	35µm	-	-		-	-	2.4.8.2
1. after thermal stress		0,8	1,05		1,25	1,40	2.4.8.3
2. at 125°C		0,7	0,7		1,15	1,30	
3. after process solutions		0,55	0,8		1,25	1,40	
Moisture Absorptions, maximum		-	0,5	%	-	0,09	2.6.2.1
Flexural strength, minimum	A: Length direction	-	415	N/mm2	-	595	2.4.4
	B: Cross direction	-	345		-	412	
Flammability (Laminate and prepreg as laminated)		V0 min	V0 min	Rating	V0	V0	UL 94
CTE (pre / post Tg)							
Z		-	60/300 max.	ppm/°C	-	43/240	2.4.24
X		-	-		-	13	
Y		-	-		-	15	
T260 (TMA)	copper removed	-	30 min.	minutes	-	65	2.4.24.1
T288 / T300 (TMA)	copper removed	-	15 / 2 min.	minutes	-	16 / N/A	2.4.24.1
Density		-	-	g/cm3	1,96	1,96	
Decomposition Temperature		-	340 min.	°C	-	340	TGA
Electrical Property							
Volume resistivity, minimum	A: 96 / 35 / 90	1,0 E+06	-	MOhm-cm	5 E+07	-	2.5.17.1
	B: after moisture resistance	-	1,0 E+06		-	N/A	
	C: at elevated temp. E-24/125	1,0 E+03	1,0 E+03		5 E+08	-	
Surface resistivity, minimum	A: 96 / 35 / 90	1,0 E+04	-	MOhm	5,0 E+08	-	2.5.17.1
	B: after moisture resistance	-	1,0 E+04		-	N/A	
	C: at elevated temp. E-24/125	1,0 E+03	1,0 E+03		N/A	N/A	
Dielectric breakdown, minimum		-	40	kV	-	> 50	2.5.6
Permittivity, maximum	at 1 MHz	5,4	5,4	-	N/A	4,82	2.5.5.2/3/9
(laminate and prepreg as laminated)	at 1 GHz	5,2	5,2	-	N/A	4,40	
Loss tangent, maximum	at 1 MHz	0,035	0,035	-	0,012	0,012	2.5.5.2/3/9
(laminate and prepreg as laminated)	at 1 GHz	-	-	-	0,014	0,014	
Arc resistance, minimum		60	60	sec	NI	NI	2.5.1
Electrical strength, minimum (laminate and prepreg as laminated)		30	-	kV/mm	56	-	2.5.6.2
CTI (comparative tracking index)		-	-	V	-	200	IEC 112
Thermal Property							
Thermal stress 10 sec at 288°C, minimum	A: unetched	Pass	Pass	Rating	Pass	Pass	2.4.13.1
	B: etched	Pass	Pass		Pass	Pass	
Tg by DSC (TMA / DMA)		170min	170min	°C	172	172(175/190)	2.4.25
Thermal conductivity		-	-	W/mK	-	0,53	Laser flash
Specific heat		-	-	J/kgK	-	915	DSC
2. Prepreg Property		IPC-Specification		Units	Typical Values		
Shelf life, minimum	A: Condition<20°C, rel. H. <50%	90		Days	meets requirements		AABUS
(from date of delivery)	B: Condition < 5°C	180			meets requirements		
Volatile content, maximum		1,5		%	< 0,3		2.3.19
Prepreg parameters		-	-	-	AABUS		AABUS

AABUS= As agreed between user and supplier

Note:

Text data contained in this data sheet represents typical values and does not constitute any warranty or guarantie. For review of critical specification tolerances, please contact a Panasonic Electric Works repesantive. Panasonic Electric Works reserve the right to change these typical values as a natural process of refering our test equipment and technics.