

Panasonic Industrial Devices Materials Europe GmbH

Specification Sheet

Specification sheet #	IPC-4101D/99	
Reinforcement:	1: Woven E-Glass	2: N/A
Resin System:	Primary: Epoxy	
	Secondary 1: Multifunctional Epoxy	Secondary 2: Modified Epoxy (max. wt. 5
Flame retardant mechanism:	Bromine	Minimum UL94 Requirement: V0
Fillers:	Inorganic fillers	
ID Reference:	UL/ANSI: FR-4.0	Mil-S-13949: /
	ANSI: FR-4.0 / 99	
	secondary 97/98/101/121/124	
Glass transition (TG):	150°C minimum	

Product name	Laminate: R-1755M	Prepreg: R-1650M
UL - Designation	R-1755M	R-1650M

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 B: Standard profile copper foil 1. after thermal stress 2. at 125°C 3. after process solutions	18µm	0,7	0,7	N/mm	-	-	2.4.8 2.4.8.2 2.4.8.3
	35µm	0,8	1,05		1,4	1,5	
		0,7	0,7		1,3	1,3	
		0,55	0,8		1,4	1,5	
		-	0,5		%	-	
Moisture Absorptions, maximum	A: Length direction	-	415	N/mm2	-	520	2.4.4
	B: Cross direction	-	345		-	440	
Flexural strength, minimum		V0 min	V0 min	Rating	V0	V0	UL 94
Flammability (Laminate and prepreg as laminated)							
CTE (pre / post Tg)							
Z		-	60/300 max.	ppm/°C	-	40/240	2.4.24
X		-	-	-	-	13	
Y		-	-	-	-	15	
T260 (TMA)	copper removed	-	30 min.	minutes	-	>120	2.4.24.1
T288 / T300 (TMA)	copper removed	-	15 min.	minutes	-	35 / N/A	2.4.24.1
Density		-	-	g/cm3	2,0	2,0	
Decomposition Temperature (5% loss)		-	325 min.	°C	-	355	2.4.24.6
Electrical Property							
Volume resistivity, minimum	A: 96 / 35 / 90	1,0 E+06	-	MΩm-cm	5 E+07	-	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		5 E+08	-	
Surface resistivity, minimum	A: 96 / 35 / 90	1,0 E+04	-	MΩm	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 (laminate and prepreg as laminated)	at 1 MHz	5,4	5,4	-	N/A	4,95	2.5.5.2/3/9
	at 1 GHz	5,2	5,2	-	N/A	4,60	
Loss tangent, maximum (laminate and prepreg as laminated)	at 1 MHz	0,035	0,035	-	0,014	0,014	2.5.5.2/3/9
	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	70	-	2.5.6.2
CTI (comparative tracking index)		-	-	V	-	200	ASTM D3638
CAF resistance		-	AABUS	pass/fail	-	pass	2.6.25
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)		150min	150min	°C	152	153(145/175)	2.4.25
Thermal conductivity		-	-	W/mK	-	0,57	Laser flash
Specific heat		-	-	J/kgK	-	930	DSC
2. Prepreg Property		IPC-Specification		Units	Typical Values		
Shelf life, minimum (from date of delivery)	A: Condition <20°C, rel. H. <50%	90		Days	meets requirements		AABUS
	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 guarantee. For review of critical specification tolerances, please contact a Panasonic Industrial Devices Materials Europe representative. Panasonic Industrial Devices Materials serve the right to change these typical values as a natural process of referring our test equipment and technics.