

# Panasonic Industrial Devices Materials Europe GmbH

## Specification Sheet

Specification sheet #

IPC-4101D/127

Reinforcement:

1: Woven E-Glass

2: N/A

Resin System:

Primary: Epoxy

Secondary 1: Multifunctional Epoxy

Secondary 2: N/A

Flame retardant mechanism:

Phosphorous

Minimum UL94 Requirement: V1

Fillers:

Inorganic fillers

ID Reference:

UL/ANSI: FR-4.1

Mil-S-13949: N/A

ANSI: FR-4.1 / 127

secondary 122/125/128

† 900 ppm max. Br or Cl and

110°C minimum

1500 ppm max. Br + Cl

Glass transition (TG):

<b>Product name</b>	<b>Laminate: R-1566 / R-1566W</b>	<b>Prepreg: R-1551 / R-1551W</b>
<b>UL - Designation</b>	R-1566	R-1551

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)
<b>Physical Property</b>							
<b>Peel strength, minimum</b> 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		1,5	1,6	
	0,7	0,7	1,4		1,5		
	0,55	0,8	1,5		1,6		
	-	0,8	%		-	0,11	
<b>Moisture Absorptions, maximum</b>		-	0,8	%	-	0,11	2.6.2.1
<b>Flexural strength, minimum</b>	A: Length direction	-	415	N/mm2	-	595	2.4.4
	B: Cross direction	-	345		-	412	
Flammability (Laminate and prepreg as laminated)		V1 min.	V1 min	Rating	V0	V0	UL 94
<b>CTE (pre / post Tg)</b>							
Z		-	-	ppm/°C	-	40/180	2.4.24
X		-	-		-	13	
Y		-	-		-	15	
<b>T260 (TMA)</b>	copper removed	-	-	minutes	-	>120	2.4.24.1
<b>T288 / T300 (TMA)</b>	copper removed	-	-	minutes	-	22 / NA	2.4.24.1
<b>Density</b>		-	-	g/cm3	2,0	2,0	
<b>Decomposition Temperature (5% loss)</b>		-	-	°C	-	350	2.4.24.6
<b>Electrical Property</b>							
<b>Volume resistivity, minimum</b>	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		-	1,0 E+07	
	C: at elevated temp. E-24/125	1,0 E+03	1,0 E+03		5,0 E+06	5,0 E+06	
<b>Surface resistivity, minimum</b>	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	
<b>Dielectric breakdown, minimum</b>		-	40	kV	-	> 50	2.5.6
<b>Permittivity, maximum</b> ( 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	-	-	-	N/A	4,7	
<b>Loss tangent, maximum</b> ( 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	-	-	-	0,011	0,011	
<b>Arc resistance, minimum</b>		60	60	sec	NI	NI	2.5.1
<b>Electrical strength, minimum / laminate and prepreg as laminated</b>		30	-	kV/mm	49	-	2.5.6.2
<b>CTI (comparative tracking index)</b>		-	-	V	-	500	ASTM D3638
<b>CAF resistance</b>		-	AABUS	pass/fail	-	pass	2.6.25
<b>Thermal Property</b>							
<b>Thermal stress 10 sec at 288°C, minimum</b>	A: unetched	Pass	Pass	Rating	Pass	Pass	2.4.13.1
	B: etched	Pass	Pass		Pass	Pass	
<b>Tg by DSC (TMA / DMA)</b>		110 min.	110min	°C	152,7	153(145/180)	2.4.25
<b>Thermal conductivity</b>		-	-	W/mK	-	0,62	Laser flash
<b>Specific heat</b>		-	-	J/kgK	-	950	DSC
<b>2. Prepreg Property</b>		IPC-Specification		Units	Typical Values		
<b>Shelf life, minimum</b> (from date of delivery)	A: Condition <20°C, rel. H. <50%	90		Days	60		AABUS
	B: Condition <5°C	180			180		
<b>Volatile content, maximum</b>		0,75		%	meets requirements		2.3.19
<b>Prepreg parameters</b>		-		-	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.