



DE104 Laminate and Prepreg

DE104 offers excellent thermal resistance, due to its special resin system and a low coefficient of thermal expansion in the Z-axis.

The glass transition temperature (Tg) is 135°C (DSC). Time to delamination of the laminate at a temperature of 260°C is greater 12 minutes and the decomposition temperature (Td) is 315°C. The product is listed as FR-4 and can be processed using standard parameters. DE104 multilayer (ML) corresponds to NEMA-grade FR-4 and meets the requirements of IPC-4101C /21.

This product is available to our customers in Europe.

www.isola-group.com/products/DE104

ORDERING INFORMATION:

Contact your local sales representative or visit www.isola-group.com for further information.

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Low Tg Material

DE104 Data Sheet

Dk 4.37, Df 0.022
Tg 135, Td 315
/21

Features

- High Thermal Performance
 - ▶ Tg: 135°C (DSC)
 - ▶ Td: 315°C (TGA @ 5% wt loss)
- T260: 12 minutes
- RoHS Compliant
- UV Blocking and AOI Fluorescence
 - ▶ High throughput and accuracy during PCB fabrication and assembly
- Standard Availability
 - ▶ Thickness: 0.002" (0.05 mm) to 0.093" (2.4 mm)
 - ▶ Available in sheet or panel form
- Prepreg Standard Availability
 - ▶ Roll or panel form
 - ▶ Tooling of prepreg panels available
- Copper Foil Type Availability
 - ▶ Standard HTE Grade 3
 - ▶ RTF (Reverse Treat Foil)
- Copper Weights
 - ▶ ½, 1 and 2 oz (18, 35 and 70 µm) available
 - ▶ Heavier copper available upon request
 - ▶ Thinner copper foil available upon request
- Glass Fabric Availability
 - ▶ Standard E-glass
 - ▶ Square weave glass fabric available
 - ▶ Spread glass fabric available
- Industry Approvals
 - ▶ IPC-4101D WAM1 /21
 - ▶ UL – File Number E41625
 - ▶ Qualified to UL's MCIL Program

DE104 Typical Values

Property	Typical Values			
		Units	Test Method	
	Typical Value	Metric (English)	IPC-TM-650 (or as noted)	
Glass Transition Temperature (Tg) by DSC	135	°C	2.4.25	
Decomposition Temperature (Td) by TGA @ 5% weight loss	315	°C	ASTM D3850	
T260	12	Minutes	2.4.24.1	
T288	–	Minutes	2.4.25	
CTE, Z-axis	A. Pre-Tg B. Post-Tg	70 250	ppm/°C	2.4.24
CTE, X-, Y-axes	A. Pre-Tg B. Post-Tg	16/13 14/7	ppm/°C	2.4.24
Z-axis Expansion (50-260°C)	4.2	%	2.4.24	
Thermal Conductivity	0.36	W/mK	ASTM D5930	
Thermal Stress 10 sec @ 288°C (550.4°F)	A. Unetched B. Etched	Pass	Rating	2.4.13.1
Dk, Permittivity (Laminate & prepreg as laminated) Split Post Method, Tested at 50% resin	A. @ 100 MHz B. @ 500 MHz C. @ 1 GHz D. @ 2 GHz E. @ 5 GHz	4.46 4.40 4.37 4.35 4.32	–	2.5.5.3 2.5.5.9 2.5.5.5
Df, Loss Tangent (Laminate & prepreg as laminated) Split Post Method, Tested at 50% resin	A. @ 100 MHz B. @ 500 MHz C. @ 1 GHz D. @ 2 GHz E. @ 5 GHz	0.020 0.021 0.022 0.023 0.024	–	2.5.5.3 2.5.5.9 2.5.5.5
Volume Resistivity	A. 96/35/90 B. After moisture resistance C. At elevated temperature	– 1.3x10 ⁶ 3.4x10 ⁷	MΩ-cm	2.5.17.1
Surface Resistivity	A. 96/35/90 B. After moisture resistance C. At elevated temperature	– 1.0x10 ⁶ 7.2x10 ⁶	MΩ	2.5.17.1
Dielectric Breakdown	>50	kV	2.5.6	
Arc Resistance	105	Seconds	2.5.1	
Electric Strength (Laminate & prepreg as laminated)	54 (1350)	kV/mm (V/mil)	2.5.6.2	
Comparative Tracking Index (CTI)	2	Class (Volts)	–	
Peel Strength	A. Low profile copper foil and very low profile – all copper weights >17 microns B. Standard profile copper 1. After thermal stress 2. At 125°C (257°F) 3. After process solutions	1.23 (7.0) – 1.58 (9.0) 1.23 (7.0) 1.58 (9.0)	N/mm (lb/inch)	2.4.8 2.4.8.2 2.4.8.3 – –
Flexural Strength	A. Lengthwise direction B. Crosswise direction	84,000 65,200	lb/inch ²	2.4.4
Tensile Strength	A. Lengthwise direction B. Crosswise direction	57,000 42,400	lb/inch ²	–
Moisture Absorption	0.3	%	2.6.2.1	
Flammability (Laminate & prepreg as laminated)	V-0	Rating	UL 94	
Max Operating Temperature	130	°C	–	

The data, while believed to be accurate and based on analytical methods considered to be reliable, is for information purposes only. Any sales of these products will be governed by the terms and conditions of the agreement under which they are sold.

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