DE104

Low Tg Laminate and Prepreg

Tg 135°C Td 315°C Dk 4.37 Df 0.022

IPC-4101 /21 UL - File Number E41625

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

PRODUCT FEATURES

Industry Recognition

- UL File Number: E41625
- RoHS Compliant

Processing Advantages

- FR-4 process compatible
- UV blocking and AOI fluorescence

PRODUCT AVAILABILITY

Standard Material Offering: Laminate

- 2 to 93 mil (0.05 to 2.4 mm)

Copper Foil Type

- HTE Grade 3

Copper Weight

- ½, 1 and 2 oz (18, 35 and 70 µm) available
- Thinner copper foil available

Standard Material Offering: Prepreg

- Roll or panel form
- Tooling of prepreg panels

Glass Fabric Availability

- E-glass
- Square weave glass
- Mechanically spread glass

ORDERING INFORMATION:

Contact your local sales representative or contact info@isola-group.com for further information.

The glass transition temperature (Tg) is 135°C (DSC). Time to delamination of the laminate at a temperature of 260°C is 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-4101.

PRODUCT ATTRIBUTES

TYPICAL MARKET APPLICATIONS

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Typical Values Table

Property		Typical Value	Units	Test Method
			Metric (English)	IPC-TM-650 (or as noted)
Glass Transition Temperature (Tg) by DSC		135	°C	2.4.25C
Decomposition Temperature (Td) by TGA @ 5% weight loss		315	°C	2.4.24.6
Time to Delaminate by TMA (Copper removed)	T260	12	Minutes	2.4.24.1
Z-Axis CTE	A. Pre-Tg B. Post-Tg C. 50 to 260°C, (Total Expansion)	70 250 4.2	ppm/°C ppm/°C %	2.4.24C
X/Y-Axis CTE	Pre-Tg	16/13	ppm/°C	2.4.24C
Thermal Conductivity		0.36	W/m·K	ASTM E1952
Thermal Stress 10 sec @ 288ºC (550.4ºF)	A. Unetched B. Etched	Pass	Pass Visual	2.4.13.1
Dk, Permittivity	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 2.5.5.3 2.5.5.9 2.5.5.5 2.5.5.5
Df, Loss Tangent	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 2.5.5.3 2.5.5.9 2.5.5.5 2.5.5.5
Volume Resistivity	A. C-96/35/90 B. After moisture resistance C. At elevated temperature	— 1.3×10^6 3.4×10^7	MΩ-cm	2.5.17.1
Surface Resistivity	A. C-96/35/90 B. After moisture resistance C. At elevated temperature	— 1.0×10^6 7.2×10^6	MΩ	2.5.17.1
Dielectric Breakdown		>50	kV	2.5.6B
Arc Resistance		105	Seconds	2.5.1B
Electric Strength (Laminate & laminated prepreg)		54 (1350)	kV/mm (V/mil)	2.5.6.2A
Comparative Tracking Index (CTI)		2	Class (Volts)	UL 746A ASTM D3638
Peel Strength	A. B. Standard profile copper 1. After thermal stress 2. At 125ºC (257ºF) 3. After process solutions	1.23 (7.0) 1.58 (9.0) 1.23 (7.0) 1.58 (9.0)	N/mm (lb/inch)	2.4.8C 2.4.8.2A 2.4.8.3 2.4.8.3
Flexural Strength	A. Length direction B. Cross direction	579 (84.0) 450 (65.2)	MPa (kpsi)	2.4.4B
Tensile Strength	A. Length direction B. Cross direction	393 (57.0) 292 (42.4)	MPa (kpsi)	ASTM D3039
Moisture Absorption		0.3	%	2.6.2.1A
Flammability (Laminate & laminated prepreg)		V-0	Rating	UL 94
Relative Thermal Index (RTI)		130	°C	UL 94

NOTES

Visit our site http://www.isola-group.com for more details.
Revisions:
A: Initial release - 4/17
B; Correct 5GHz Df label - 8-17
C: Corrected units for Flexural and Tensile Strength - 8/18
D: Change MOT to RTI 5/19