

IPC-4101 /134 UL - File Number E41625

TerraGreen® 400GE laminate materials are our most advanced ultra high speed, halogen free ultra low loss design solution.

PRODUCT FEATURES

Industry Recognition

- UL File Number: E41625
- RoHS Compliant

Performance Attributes

- CAF resistant
- Low moisture absorption
- Halogen free
- 0.8 mm pitch capable
- 6x 260°C reflow capable
- 6x 288°C solder float capable

Processing Advantages

- FR-4 process compatible
- Excellent fill and flow for heavy copper
- Multiple lamination cycles
- HDI technology compatible

PRODUCT AVAILABILITY

Standard Material Offering: Laminate

- 2 to 18 mil (0.05 to 0.46 mm)

Copper Foil Type

- HVLP3 (VLP1) ≤1.1 micron Rz JIS
- RTF3 ≤2.5 micron Rz JIS

Copper Weight

- ½, ¾, 1 oz (12, 18 and 35 µm) available
- Thinner copper foil available

Standard Material Offering: Prepreg

- Tooling of prepreg panels

Glass Fabric Availability

- Low Dk glass
- Mechanically spread glass

TerraGreen® 400GE is our Halogen Free material solution for next generation 5G infrastructure, data center systems, high end computing, wired & wireless communications and AI applications. Our novel resin system, ultra smooth HVLP3(VLP1) copper foil and Low Dk glass has been engineered for very high data rates of >100 Gb/s with excellent cost for loss performance.

The TerraGreen® 400GE resin system has proven superior CAF performance on tight pitch testing. CAF performance is enhanced by the resin systems excellent interlaminar and bond line adhesion strength.

TerraGreen® 400GE is lead free compatible and sequential lamination capable and can be processed utilizing standard PCB equipment and processing steps. TerraGreen® 400GE meets UL94 V-0.

PRODUCT ATTRIBUTES



TYPICAL MARKET APPLICATIONS



ORDERING INFORMATION:

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

Isola Group

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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		200	°C	2.4.25C
Glass Transition Temperature (Tg) by DMA		215	°C	2.4.24.4
Glass Transition Temperature (Tg) by TMA		180	°C	2.4.24C
Decomposition Temperature (Td) by TGA @ 5% weight loss		>380C	°C	2.4.24.6
Time to Delaminate by TMA (Copper removed)	A. T288 B. T300	60+	Minutes	2.4.24.1
Z-Axis CTE	A. Pre-Tg B. Post-Tg C. 50 to 260°C, (Total Expansion)	40 170 1.8	ppm/°C ppm/°C %	2.4.24C
X/Y-Axis CTE		12-21	ppm/°C	2.4.24C
Thermal Conductivity		0.54	W/m·K	ASTM E1952
Thermal Stress 10 sec @ 288°C (550.4°F)	A. Unetched B. Etched	Pass	Pass Visual	2.4.13.1
Dk, Permittivity	A. @ 5 GHz B. @ 10 GHz C. @ 20 GHz	3.1	—	Bereskin Stripline
Df, Loss Tangent	A. @ 5 GHz B. @ 10 GHz C. @ 20 GHz	0.0015	—	Bereskin Stripline
Volume Resistivity	C-96/35/90	2.0x10(8)	MΩ-cm	2.5.17.1
Surface Resistivity	C-96/35/90	2.0x10(7)	MΩ	2.5.17.1
Dielectric Breakdown		70	kV	2.5.6B
Arc Resistance		180	Seconds	2.5.1B
Electric Strength (Laminate & laminated prepreg)		67(1700)	kV/mm (V/mil)	2.5.6.2A
Comparative Tracking Index (CTI)		2	Class (Volts)	UL 746A ASTM D3638
Peel Strength	A. Low profile copper foil and very low profile copper foil all copper foil >17 µm [0.669 mil] B. Low profile and very ow profile copper foil >17 µm ...After thermal stress	0.7 (4.1) 0.7(4.1)	N/mm (lb/inch)	2.4.8C 2.4.8.2A
Flexural Strength	A. Length direction B. Cross direction	393(57) 338(49)	MPa (kpsi)	2.4.4B
Tensile Strength	A. Length direction B. Cross direction	32 28	ksi	ASTM D3039
Young's Modulus	A. Length direction B. Cross direction	TBD	ksi	ASTM D790-15e2
Flexural Modulus	A. Lengthwise B. Crosswise	12,060 11,700	MPa	ASTM D790-15e2
Poisson's Ratio	A. Length direction B. Cross direction	TBD	—	ASTM D3039
Moisture Absorption			%	2.6.2.1A
Flammability (Laminate & laminated prepreg)		V-0	Rating	UL 94
Relative Thermal Index (RTI)		150	°C	UL 796

NOTES

Notes:

Revisions:

A: Preliminary Release - 11/2022

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