

IPC-4103 /17 IPC-4101 /102 UL - File Number E41625

TerraGreen® laminate materials exhibit exceptional electrical properties which are very stable over a broad frequency and temperature range.

## PRODUCT FEATURES

### Industry Recognition

- RoHS Compliant

### Performance Attributes

- Lead-free assembly compatible

### Processing Advantages

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

## PRODUCT AVAILABILITY

### Standard Material Offering: Laminate

- Available in full size sheet or panel form

### Copper Foil Type

- HTE Grade 3
- HVLP (VLP2) 2.5 micron Rz JIS, 1 oz and below is standard

### Copper Weight

- ½ to 2 oz (18 to 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

TerraGreen® is engineered for such highperformance applications as power amplifier boards for LTE base stations, internet infrastructure and cloud computing. TerraGreen® features a Dielectric Constant (Dk) that is stable between -55°C and 125°C, up to 20 GHz.

TerraGreen® is a lead-free assembly material and is easy to process. This high-performance material utilizes a short-lamination cycle; the product is easy to drill, does not require plasma desmear, and the prepreg shelf life is similar to FR-4 materials. TerraGreen® is suitable for high-layer count, high-speed digital backplanes and is compatible with Isola's FR-4 materials for hybrid designs.

TerraGreen® meets UL 94 V-0 and is halogen free.

## PRODUCT ATTRIBUTES



## TYPICAL MARKET APPLICATIONS



## ORDERING INFORMATION:

Contact your local sales representative or contact [info@isola-group.com](mailto:info@isola-group.com) for further information.

### Isola Group

6565 West Frye Road Chandler, AZ 85226 Phone: 480-893-6527 Fax: 480-893-1409

### Isola Asia Pacific

(Hong Kong) Ltd. 12/F, Kin Sang Commercial Centre, 49 King Yip Street, Kwun Tong, Kowloon, Hong Kong Phone: 852-2418-1318 Fax: 852-2418-1533

### Isola GmbH

Isola Strasse 2 D-52348 Düren, Germany Phone: 49-2421-8080 Fax: 49-2421-808164

# 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
Decomposition Temperature (Td) by TGA @ 5% weight loss	390	°C		2.4.24.6
Time to Delaminate by TMA (Copper removed)	A. T260 B. T288	60	Minutes	2.4.24.1
Z-Axis CTE	50 to 260°C, (Total Expansion)	2.9	%	2.4.24C
X/Y-Axis CTE	Pre-Tg	16	ppm/°C	2.4.24C
Thermal Conductivity		0.32	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. @ 2 GHz B. @ 5 GHz C. @ 10 GHz	3.44	—	2.5.5.5
Df, Loss Tangent	A. @ 2 GHz B. @ 5 GHz C. @ 10 GHz	0.0039	—	Bereskin Stripline
Volume Resistivity	C-96/35/90	$1.33 \times 10^7$	MΩ-cm	2.5.17.1
Surface Resistivity	C-96/35/90	$1.33 \times 10^5$	MΩ	2.5.17.1
Dielectric Breakdown		45.4	kV	2.5.6B
Arc Resistance		139	Seconds	2.5.1B
Electric Strength (Laminate & laminated prepreg)		45 (1133)	kV/mm (V/mil)	2.5.6.2A
Comparative Tracking Index (CTI)		2	Class (Volts)	UL 746A ASTM D3638
Peel Strength	A. 0.5 oz. EDC foil B. 1 oz. EDC foil	0.88 (5.0)	N/mm (lb/inch)	2.4.8C
Flexural Strength	A. Length direction B. Cross direction	75.5 60.0	ksi	2.4.4B
Tensile Strength	A. Length direction B. Cross direction	40.0 39.0	ksi	ASTM D3039
Young's Modulus	A. Length direction B. Cross direction	3125 2745	ksi	ASTM D790-15e2
Poisson's Ratio	A. Length direction B. Cross direction	0.238 0.231	—	ASTM D3039
Moisture Absorption		0.05	%	2.6.2.1A
Flammability (Laminate & laminated prepreg)		V-0	Rating	UL 94
Relative Thermal Index (RTI)		130	°C	UL 796

## NOTES

Visit our site <http://www.isola-group.com> for more details.

Revisions:

A: Initial release - 4/17

B: Corrected units for Flexural and Tensile Strength - 8/18

C: Change MOT to RTI 5/19

D: Added CTI value 01/20

E: Changed VLP2 to HVLP to align with common industry terms 4/21

Isola, the Isola logo, Astra, Chronon, GETEK, I-Fill, IsoDesign, IsoStack, I-Speed, I-Tera, Polyclad, Stratus, TerraGreen, and The Base for Innovation are registered trademarks or trademarks of ISOLA USA Corp. in the United States and in other countries. Copyright © 2021 Isola Group. All rights reserved.