



## TerraGreen® Halogen-free, Ultra-low Loss Material

**TerraGreen** laminate materials exhibit exceptional electrical properties which are very stable over a broad frequency and temperature range. TerraGreen is engineered for such high-performance applications as power amplifier boards for 4G 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.

[www.isola-group.com/products/TerraGreen](http://www.isola-group.com/products/TerraGreen)

### ORDERING INFORMATION:

Contact your local sales representative or visit [www.isola-group.com](http://www.isola-group.com) for further information.

**Isola Group**  
3100 West Ray Road  
Suite 301  
Chandler, AZ 85226  
Phone: 480-893-6527  
Fax: 480-893-1409  
[info@isola-group.com](mailto:info@isola-group.com)

**Isola Asia Pacific (Hong Kong) Ltd.**  
Unit 3512 - 3522, 35/F  
No. 1 Hung To Road, Kwun Tong,  
Kowloon, Hong Kong  
Phone: 852-2418-1318  
Fax: 852-2418-1533  
[info.hkg@isola-group.com](mailto:info.hkg@isola-group.com)

**Isola GmbH**  
Isolastrasse 2  
D-52348 Düren, Germany  
Phone: 49-2421-8080  
Fax: 49-2421-808164  
[info-dur@isola-group.com](mailto:info-dur@isola-group.com)

Halogen Free

# TerraGreen® Data Sheet

Tg 200, Td 390  
Dk 3.44, Df 0.0039

## Features

- High Thermal Performance
  - ▶ Tg: 200°C (DSC), (Base Laminate)
  - ▶ Td: 390°C (TGA @ 5% wt loss)
  - ▶ Low CTE in the Z-axis 2.9% (50°C – 260°C)
- T260: >60 minutes
- T288: >60 minutes
- Lead-free Compatible and RoHS Compliant
- UV Blocking and AOI Fluorescence
  - ▶ High throughput and accuracy during PCB fabrication and assembly
- Superior Processing
  - ▶ Closest to conventional FR-4 processing of all high speed digital materials
- Core Material Standard Availability
  - ▶ Thickness: 0.002" (0.050 mm) to 0.018" (0.450 mm), 0.020" (0.500 mm), 0.030" (0.750 mm) and 0.060" (1.50 mm)
  - ▶ Available in full size sheet or panel form
- Prepreg Standard Availability
  - ▶ Roll or panel form
  - ▶ Tooling of prepreg panels available
- Copper Foil Type Availability
  - ▶ VLP-2 (2 micron)
- 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
  - ▶ UL 94 V-0

# TerraGreen® Specifications

Property		Typical Values			
		Typical Value	Specification	Units	Test Method
				Metric (English)	IPC-TM-650 (or as noted)
<b>Glass Transition Temperature (Tg) by DSC</b>		200	170-200	°C	2.4.25
<b>Decomposition Temperature (Td) by TGA @ 5% weight loss</b>		390	–	°C	ASTM D3850
<b>T260</b>		60	–	Minutes	ASTM D3850
<b>T288</b>		60	–	Minutes	ASTM D3850
<b>CTE, X-, Y-axes</b>	A. Pre-Tg	16	AABUS	ppm/°C	2.4.24
	B. Post-Tg	18	–		
<b>Z-axis Expansion (50-260°C)</b>		2.9	–	%	2.4.24
<b>Thermal Conductivity</b>		0.32	–	W/mK	ASTM D5930
<b>Thermal Stress 10 sec @ 288°C (550.4°F)</b>	A. Unetched	Pass	Pass Visual	Rating	2.4.13.1
	B. Etched				
<b>Dk, Permittivity</b>	A. @ 2 GHz	3.44	±0.05	–	2.5.5.5
	B. @ 5 GHz	3.44	–		
	C. @ 10 GHz	3.44	–		
<b>Df, Loss Tangent</b>	A. @ 2 GHz	0.0039	±0.0005	–	Bereskin Stripline
	B. @ 5 GHz	0.0039	–		
	C. @ 10 GHz	0.0039	–		
<b>Volume Resistivity</b>	95/35/90	1.33x10 <sup>7</sup>	1.0x10 <sup>5</sup>	MΩ-cm	2.5.17.1
<b>Surface Resistivity</b>	95/35/90	1.33x10 <sup>5</sup>	1.0x10 <sup>4</sup>	MΩ	2.5.17.1
<b>Dielectric Breakdown</b>		45.4	–	kV	2.5.6
<b>Arc Resistance</b>		139	60	Seconds	2.5.1
<b>Electric Strength (Laminate &amp; prepreg as laminated)</b>		45 (1133)	30 (750)	kV/mm (V/mil)	2.5.6.2
<b>Comparative Tracking Index (CTI)</b>		In Testing	–	Class (Volts)	UL-746A ASTM D3638
<b>Peel Strength</b>	1 oz/0.5 oz EDC (Standard) Foil	5.0 (0.88)	3.0 (0.53)	N/mm (lb/inch)	2.4.8.2 2.4.8.3
<b>Flexural Strength</b>	A. Lengthwise direction	43,633	–	lb/inch <sup>2</sup>	2.4.4
	B. Crosswise direction	35,567			
<b>Tensile Strength</b>	A. Lengthwise direction	437,235	–	lb/inch <sup>2</sup>	–
	B. Crosswise direction	387,153			
<b>Moisture Absorption</b>		0.05	–	%	2.6.2.1
<b>Flammability (Laminate &amp; prepreg as laminated)</b>		V-0	–	Rating	UL 94
<b>Max Operating Temperature</b>		130 In Testing	UL Cert	°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.

[www.isola-group.com/products/TerraGreen](http://www.isola-group.com/products/TerraGreen)

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