

## 254 Laminate and Prepreg

**254** is a high-performance 150°C glass transition temperature (Tg) FR-4 system for multilayer Printed Wiring Board (PWB) applications where increased thermal performance and reliability are required. 254 laminate and prepreg products are manufactured with a unique high performance multifunctional epoxy resin, reinforced with electrical grade (E-glass) glass fabric. This system provides improved thermal performance in comparison to traditional FR-4 while retaining FR-4 processability. In addition to this superior thermal performance, the mechanical, chemical and moisture resistance properties all equal or exceed the performance of traditional FR-4 materials.

The 254 system is also laser fluorescing and UV blocking for maximum compatibility with Automated Optical Inspection (AOI) systems, optical positioning systems and photoimagable solder mask imaging.

[www.isola-group.com/products/254](http://www.isola-group.com/products/254)

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

# 254

## Data Sheet

**Tg 150, Td 340**  
**Dk 4.30, Df 0.020**  
**/21 /24**

### Features

- High Thermal Performance
  - ▶ Tg: 150°C (DSC)
  - ▶ Td: 340°C (TGA @ 5% wt loss)
  - ▶ Superior performance through multiple thermal excursions
  - ▶ Resistance to measling
  - ▶ Extended capabilities
- T260: 30 minutes
- T288: >5 minutes
- RoHS Compliant
- UV Blocking and AOI Compatible
  - ▶ Increased throughput and accuracy
  - ▶ Compatible with all AOI equipment
- Standard FR-4 Processing
- Core Material Standard Availability
  - ▶ Thickness: 0.002" (0.05 mm) to 0.125" (3.2 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
  - ▶ Standard HTE Grade 3
  - ▶ RTF (Reverse Treat Foil)
- Copper Weights
  - ▶ ½ oz, 1 oz and 2 oz available
  - ▶ Heavier copper available upon request
  - ▶ Thinner copper foil available upon request
- Glass Fabric Availability
  - ▶ Standard E-glass
  - ▶ Square weave glass fabric available
- Industry Approvals
  - ▶ IPC-4101C /21 /24
  - ▶ UL - File Number E41625
  - ▶ Qualified to UL's MCIL Program

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>	150	–	°C	2.4.25
<b>Decomposition Temperature (Td) by TGA @ 5% weight loss</b>	340	–	°C	ASTM D3850
<b>T260</b>	30	–	Minutes	2.4.25
<b>T288</b>	>5	–	Minutes	2.4.25
<b>CTE, Z-axis</b>	A. Pre-Tg B. Post-Tg	AABUS –	ppm/°C	2.4.24
<b>CTE, X-, Y-axes</b>	A. Pre-Tg B. Post-Tg	AABUS –	ppm/°C	2.4.24
<b>Z-axis Expansion (50-260°C)</b>	3.4	–	%	2.4.24
<b>Thermal Conductivity</b>	0.4-0.5	–	W/mK	ASTM D5930
<b>Thermal Stress 10 sec @ 288°C (550.4°F)</b>	A. Unetched B. Etched	Pass Pass Visual	Rating	2.4.13.1
<b>Dk, Permittivity (Laminate &amp; prepreg as laminated) Tested at 50% resin</b>	A. @ 2 GHz (Bereskin Stripline) B. @ 5 GHz (Bereskin Stripline) C. @ 10 GHz (Bereskin Stripline)	4.30 4.20 –	5.4 – –	2.5.5.3 2.5.5.9 2.5.5.5
<b>Df, Loss Tangent (Laminate &amp; prepreg as laminated) Tested at 50% resin</b>	A. @ 2 GHz (Bereskin Stripline) B. @ 5 GHz (Bereskin Stripline) C. @ 10 GHz (Bereskin Stripline)	0.020 0.022 –	0.035 – –	2.5.5.3 2.5.5.9 2.5.5.5
<b>Volume Resistivity</b>	A. 96/35/90 B. After moisture resistance C. At elevated temperature	– 2.4x10 <sup>8</sup> 2.3x10 <sup>8</sup>	– 1.0x10 <sup>4</sup> 1.0x10 <sup>3</sup>	MΩ -cm 2.5.17.1
<b>Surface Resistivity</b>	A. 96/35/90 B. After moisture resistance C. At elevated temperature	– 2.6x10 <sup>8</sup> 2.8x10 <sup>8</sup>	– 1.0x10 <sup>4</sup> 1.0x10 <sup>3</sup>	MΩ 2.5.17.1
<b>Dielectric Breakdown</b>	>50	40	kV	2.5.6
<b>Arc Resistance</b>	105	60	Seconds	2.5.1
<b>Electric Strength (Laminate &amp; prepreg as laminated)</b>	54 1350	29 736	kV/mm (V/mil)	2.5.6.2
<b>Comparative Tracking Index (CTI)</b>	3 (175-249)	–	Class (Volts)	UL-746A ASTM D3638
<b>Peel Strength</b>	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	1.05 (6.0) – 1.58 (6.0) 1.23 (4.0) 1.58 (4.5)	0.70 (4.0) – 1.05 (6.0) 0.70 (4.0) 0.80 (4.5)	2.4.8 N/mm (lb/inch) 2.4.8.2 2.4.8.3 – –
<b>Flexural Strength</b>	A. Lengthwise direction B. Crosswise direction	79,800 67,900	–	lb/inch <sup>2</sup> 2.4.4
<b>Tensile Strength</b>	A. Lengthwise direction B. Crosswise direction	53,900 41,160	–	lb/inch <sup>2</sup> –
<b>Young's Modulus</b>	A. Grain direction B. Fill direction	3486 3106	–	ksi ww
<b>Poisson's Ratio</b>	A. Grain direction B. Fill direction	0.174 0.154	–	– xx
<b>Moisture Absorption</b>	0.3	–	%	2.6.2.1
<b>Flammability (Laminate &amp; prepreg as laminated)</b>	V-0	V-0	Rating	UL-94
<b>Max Operating Temperature</b>	130	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.